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Chemical Week

New Investment Frontiers . . p. 27



Ziegler talks TEL, spells out electrolytic process details in New York . . . . . p. 37

Production trouble-shooters ride plant circuit in search of problems. Idea for you? . p. 49

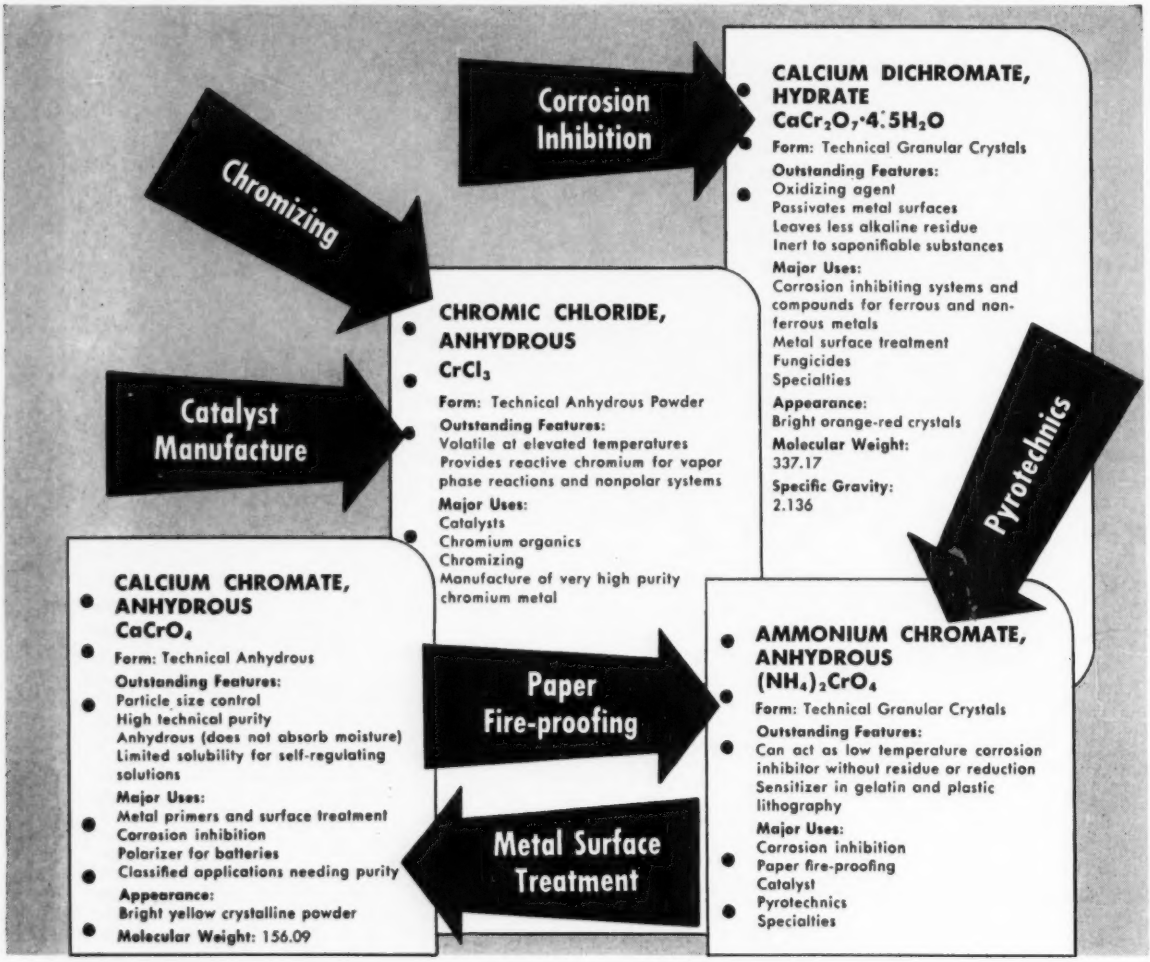
Plastic-bag deaths challenge polyethylene-film makers. What's being done . . p. 86

Harried by tyro inventors? Here's a novel way to handle outsiders' suggestions . p. 93

At World Petroleum parley, nuclear scientist pegs atom's oil production future . p. 108

June 13, 1959

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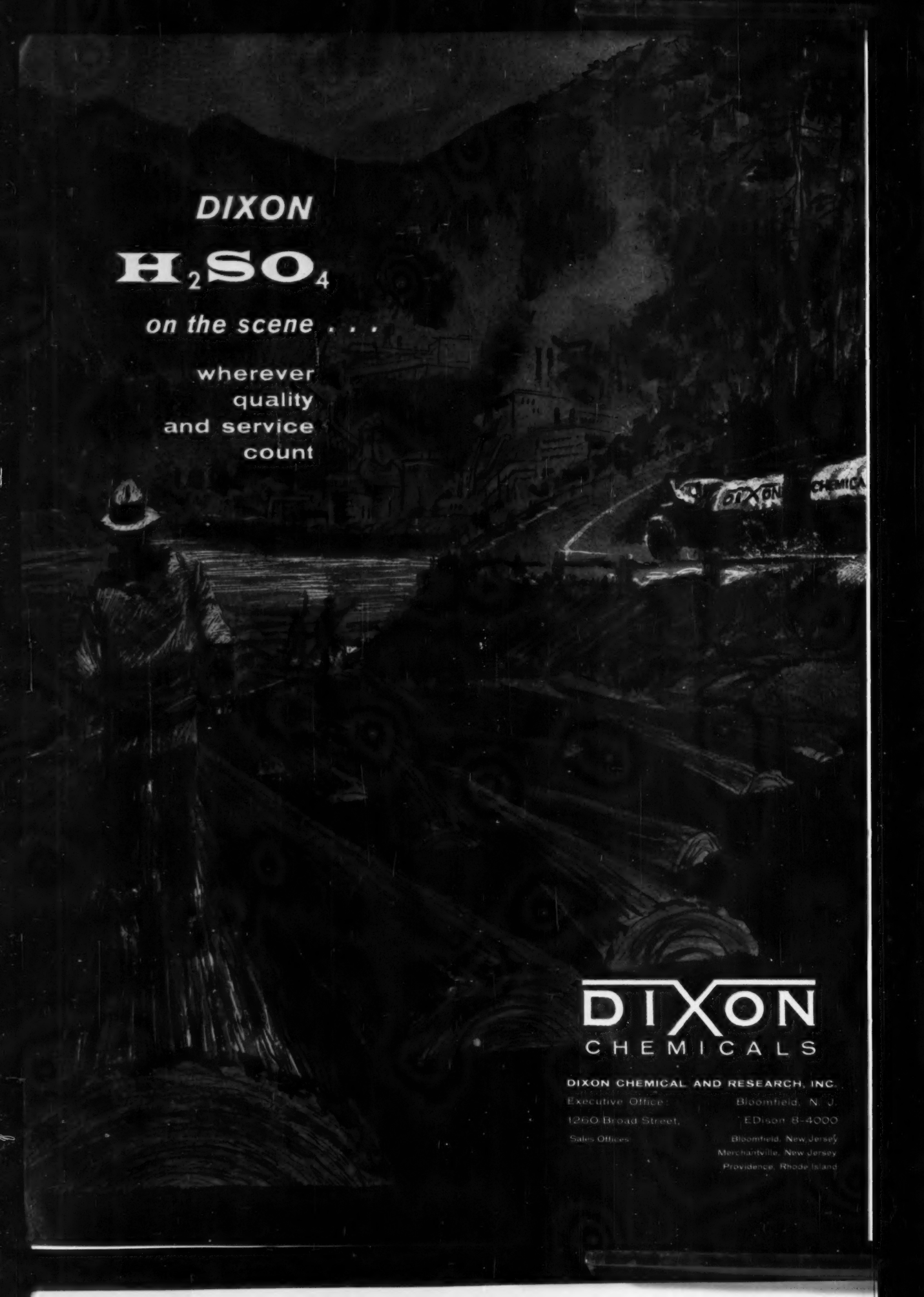
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Chemical Week

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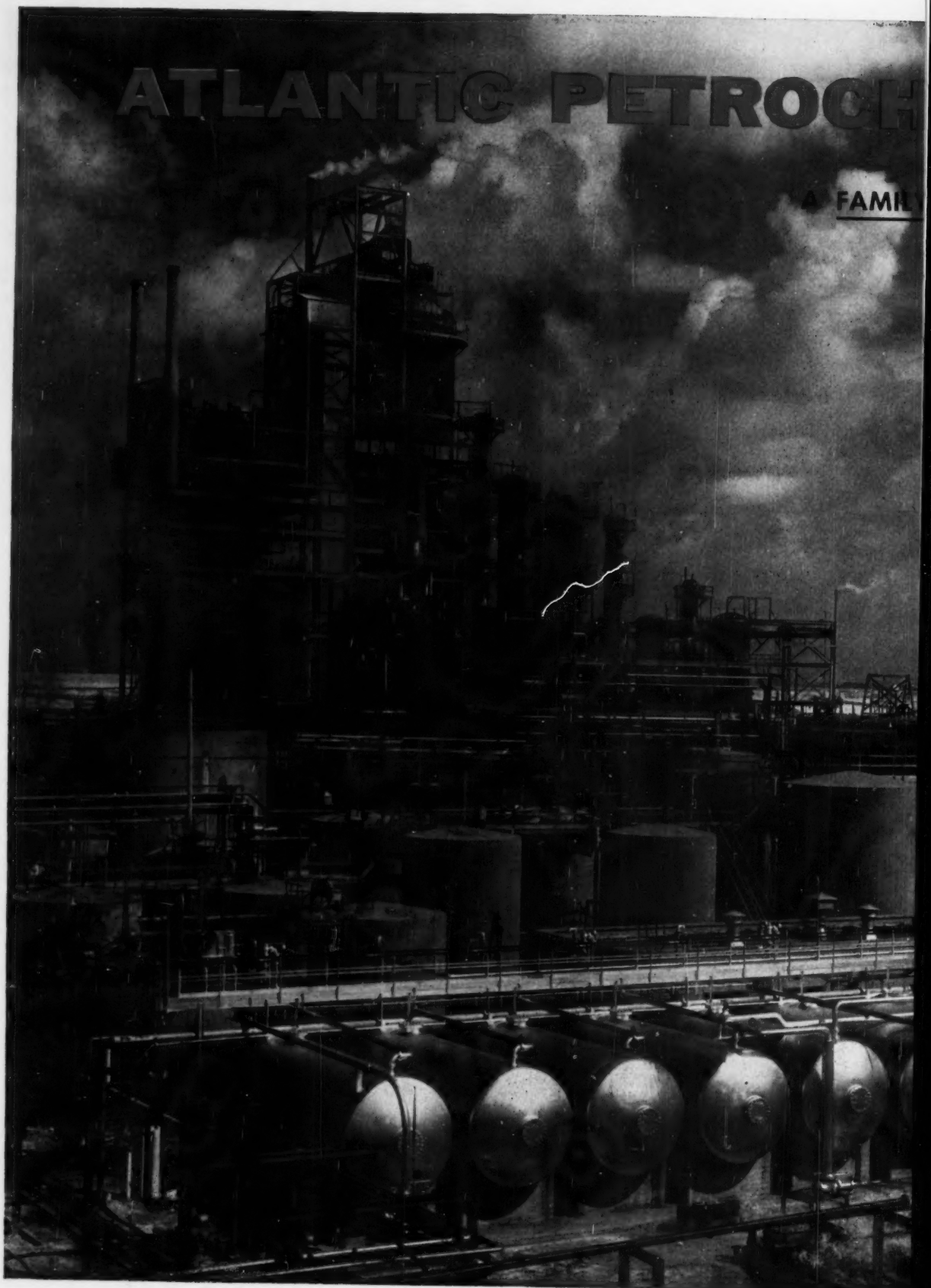
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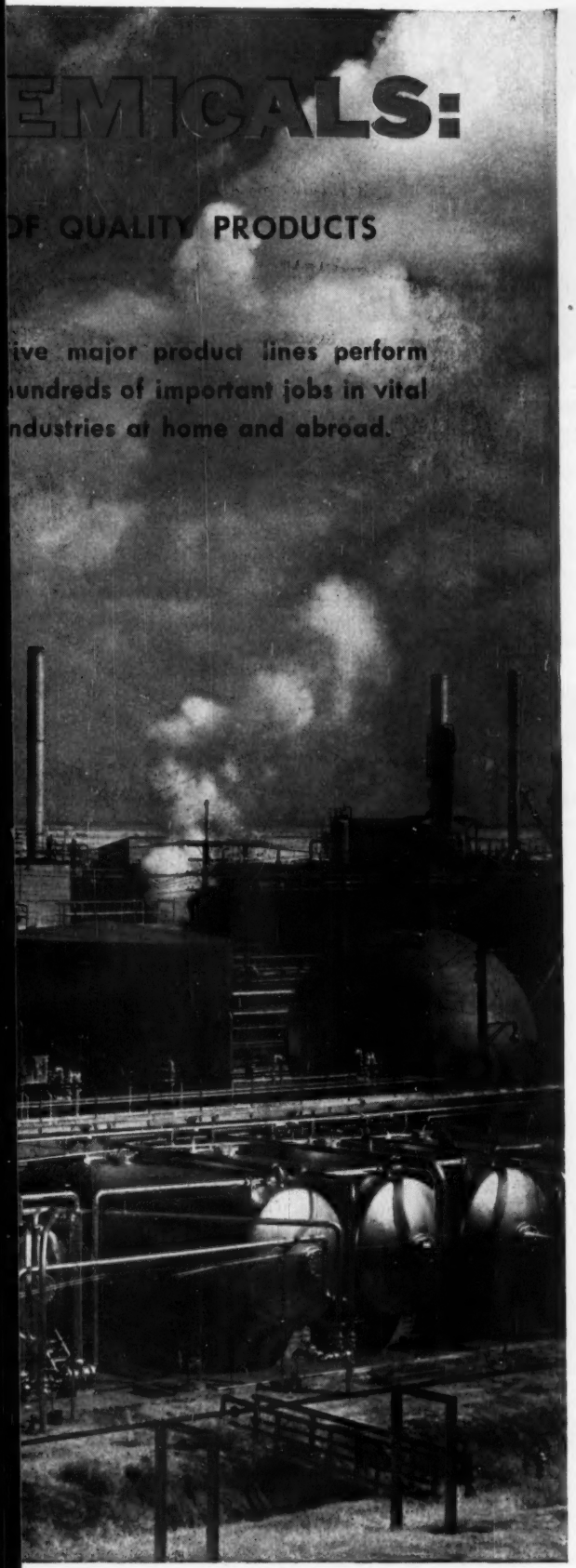
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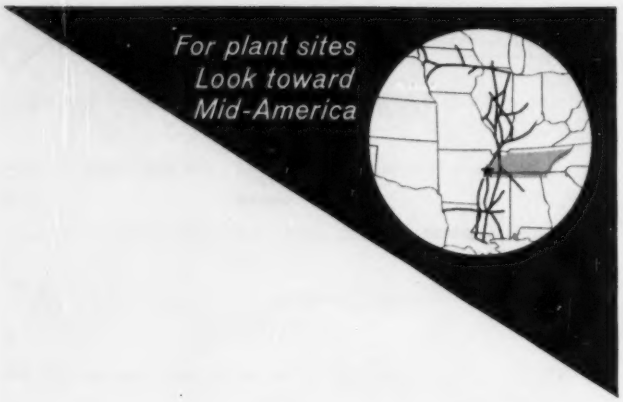
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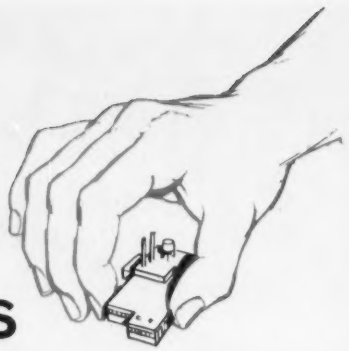
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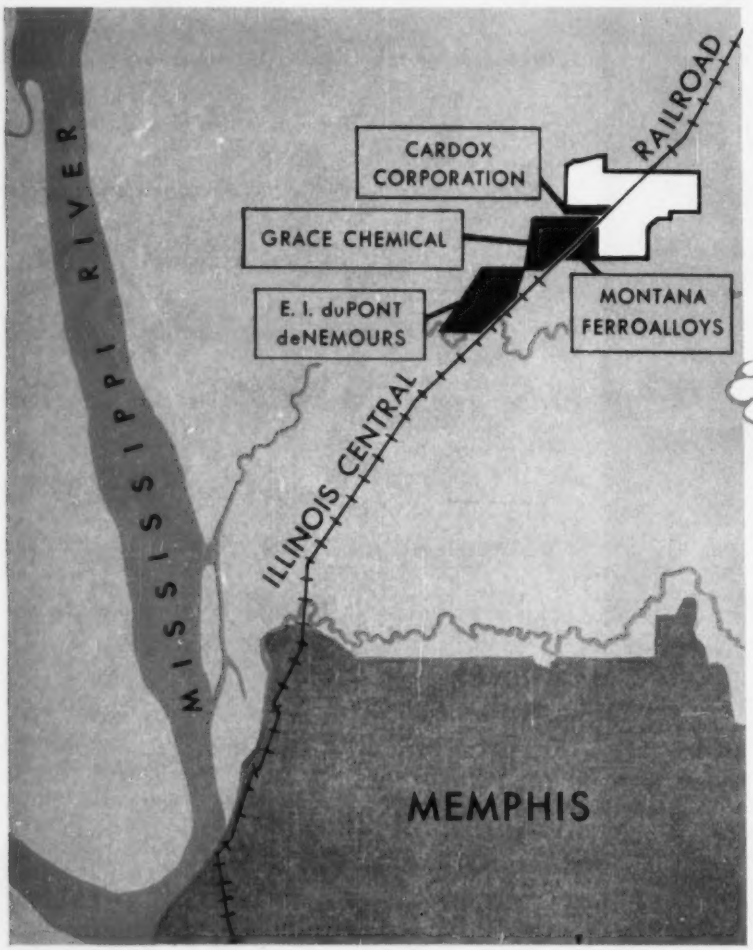
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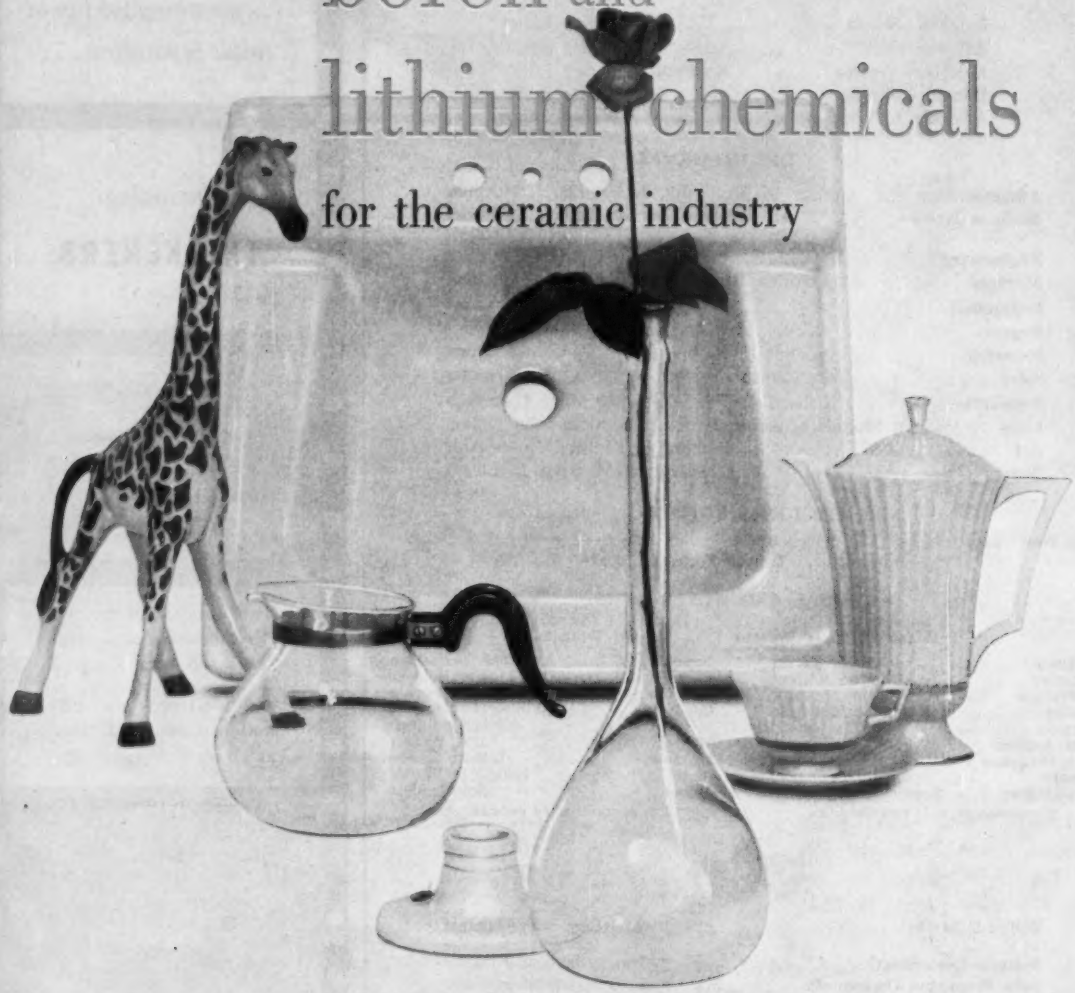
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VIEWPOINT

What are the responsibilities of private enterprise in international operations? A big one is to make a profit. But Paul Rykens, former chairman of Unilever N.V., has cited business's other obligations and responsibilities. Here's what he told the 17th Congress of the International Chamber of Commerce:

INTERNATIONAL INVESTMENT has increased considerably since the war, but is there not a tendency to take the line of least resistance, investing where it is likely to cause us the least trouble? Of course, this is perfectly comprehensible; but if we speak of the obligations and responsibilities of private enterprise and, particularly, of big business, we ought to look to the world situation and take other factors also into account.

Where is an investment particularly needed? We would very often find that the rewards increase according to the real need for an investment. We need not always be altruistic, and must consider our shareholders' interests. Big business and big financial institutions would, however, be lacking if they did not set aside a proportion of their total available funds to invest where the public interest requires.

I do not consider, for instance, that American investment in Europe or even in South America satisfies this requirement, any more than European investment in the American continents. Development of Far East, Middle East and African territories is, at present, the most essential. They are on the threshold of development and capable of enormous progress.

Of course, the political and economic stability in some territories has left much to be desired, and nationalism has frequently assumed proportions that repelled foreign investors. All this is being realized, but only gradually and with some important exceptions. The remedy rests with the countries themselves: improve the climate for foreign investors, and results will soon appear.

The scope is tremendous, and every businessman should be considering whether he can contribute to this development. Governments, especially the U.S., have set a good example; but, on the whole, private enterprise has not kept pace. We concentrate on exporting our products to these territories, but that is not the contribution I mean. Capital and men are wanted.

A large business should feel an obligation to take the world situation into consideration, to see where some of its funds might be invested — in the business's own long-term interests and in the interests of the country concerned. Such an investment can help the country, in due course, to contribute toward world political stability and economic prosperity. This may sound idealistic, but I might mention several cases where this principle has been applied in practice with some measure of success.

Take the big international oil companies. Where would the world be had they continued to concentrate on their own business in a limited area? The most prosperous oil companies have explored the world, investing money in the hope of finding an adequate return. They have succeeded in this, but have also helped the countries in which they invested their money and where they continue to work, creating a higher standard of living. These companies continue to spend money, even though the expenditure has no direct bearing on their own businesses but is entirely in the country's interests. They do this in the conviction that the country's economic interests are as important to the future prosperity of their own businesses as they are to its government and its people.

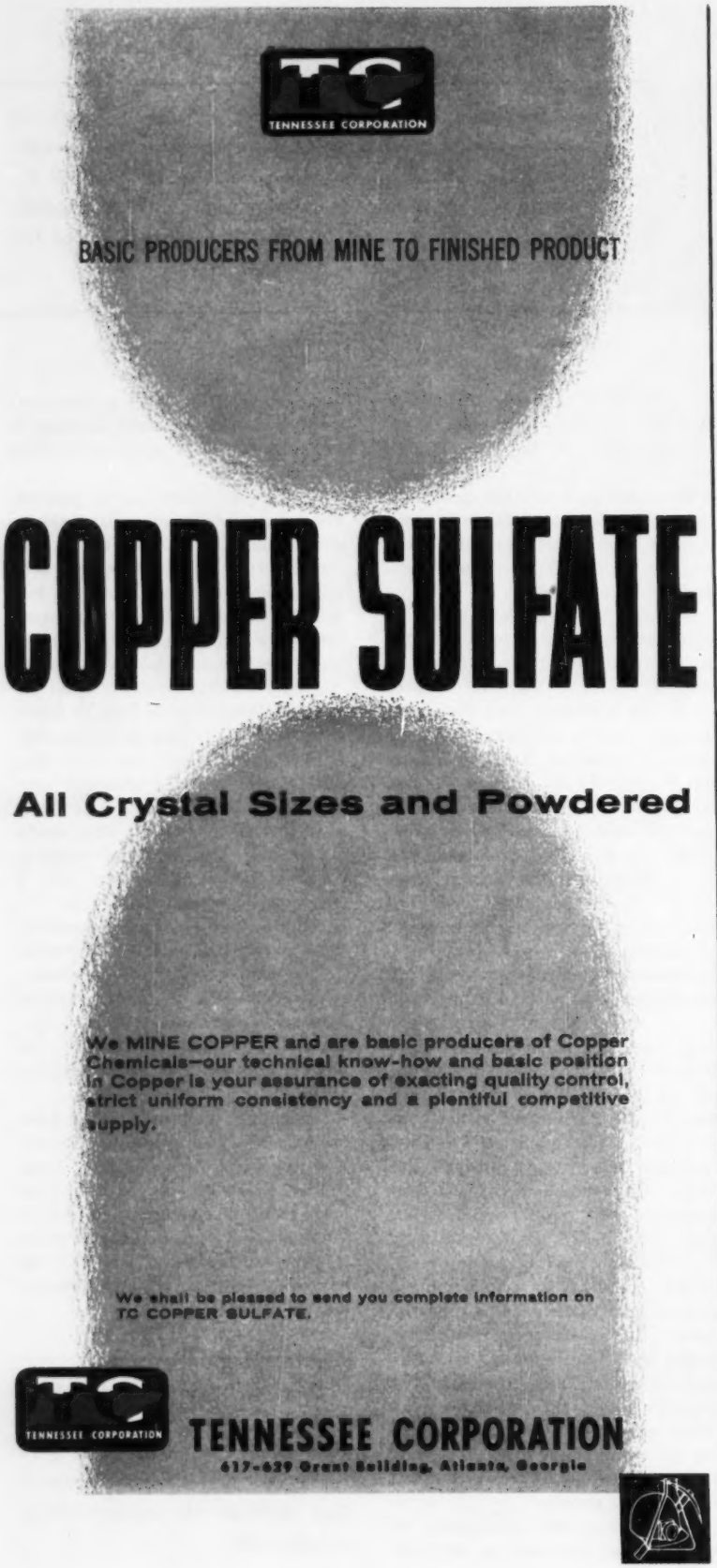
I look upon the willingness to make capital available as the first and principal duty of a private enterprise that can assume reasonable risks. But this duty rests on all of us who can do so.

The second duty is to provide know-how and managerial experience. This, too, should be in our own interest, in order to obtain better results from the investment, but it will certainly be also in the interests of the countries concerned. Here lies a great human task. We send out our own experts to start with, but it is not their duty to help to manage these businesses in perpetuity. It is to educate local talent, so that the contribution of experience may gradually be reduced and local participation increased. This again would help the investing country, because good men are rare, and if we want to expand, these men will become available as our representatives in other developing countries.

The third duty of private enterprise is to seek the most suitable form of cooperation with local elements, whether businessmen or workers, government or national institutions.

Remember, the people we send out not only do a technical job; they are also unofficial ambassadors. Their influence may be good or bad, quite apart from their technical capability. We must, therefore, find men worthy of representing their country, and educate them to act as our representatives abroad.

*Is such a program practical for U.S. chemical companies? **This week,** Chemical Week **presents** (p. 27) **a special report that outlines the opportunities ahead.**—ED.*



OPINION

Pressurized Helium

TO THE EDITOR: An elaboration might be in order concerning the statement (*CW Market Newsletter, April 25*) relative to the comparison between liquid and gaseous helium. You compare the volumetric content in liquid form as being 740 times greater than that which can be transported in a tank car holding the same volume of helium gas.

The facts as such are quite correct in that 740 times more liquefied helium can be held or transported in a tank car that holds the same volume of helium gas—provided the gas is at 1 atmosphere pressure. This is not the case in conventional transport trailers or tank cars, since we normally pressurize them to approximately 2,200 lbs. or roughly 150 atmospheres. This now changes the facts somewhat, in that only five times more liquid helium can be transported in a tank car that holds the same volume of helium gas and is pressurized to the normal 2,200 lbs.

We are all encouraged, of course, by the savings to be realized in transporting liquid gases of any type, but let's not make it appear that it's as good as your article indicates.

S. L. SULLIVAN
Assistant Manager, Engineering Services
Air Reduction Sales Co.
Jersey City, N.J.

Well Integrated

TO THE EDITOR: Just finished the discussion on "Vertical Integration," by James Margolis, and wanted to compliment you and the author for a job well done.

LOUIS BLECHER
Director, Organic Chemical Sales
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Lodi, N.J.

MEETINGS

National Industrial Pharmaceutical Research Conference, King's Gateway, Land O'Lakes, Wis., June 14-17.

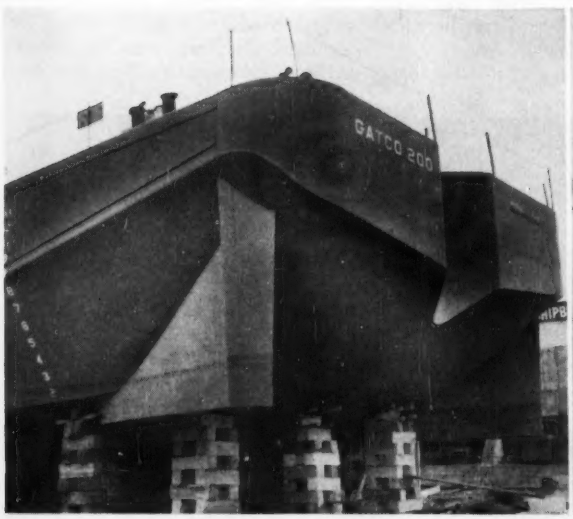
Technical Assn. of Graphic Arts, annual meeting, Manger Hotel, Rochester, N.Y., June 15-17.

Instrument Society of America, second nuclear instrumentation symposium, Idaho Falls, Ida., June 17-19.

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DOW | CHEMICAL RESEARCH makes old theories pay off

Dusty old chemical phenomena, like ion exchange and chelation, for years were considered only academically interesting. Now they're being re-examined, probed by further experimentation, and applied to revolutionized modern chemical processing. And today's advances are only an in-between step to new and more profitable applications in the future. This series of chemical news notes will help you keep abreast of these developments.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

ROUTE TO:

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NEW ION EXCHANGE RESIN WITH "MUSCLES" STARS AS CATALYST

Nearly a century after the discovery of the ion exchange principle, and fifty years since the first industrial application of ion exchange resins—Dow research chemists at Midland have developed a new ion exchange resin with until-now-unheard-of stability—one that will herald new advances in catalytic processes. This remarkable material is Dowex® 50W.

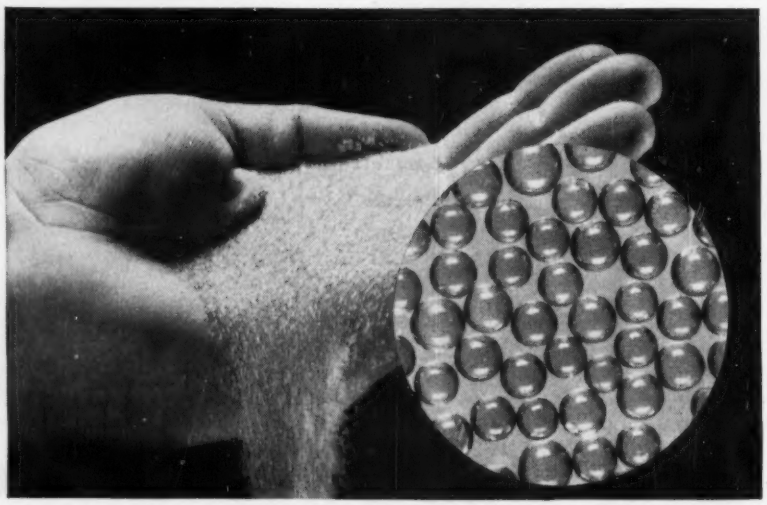
For as long as chemical engineers have been using ion exchange resins as catalysts, researchers have been trying to develop a product with a low metal content, plus excellent physical and chemical stability.

With the development of Dowex 50W, Dow has come up with a tough, high-stability, high-capacity ion exchange resin that gives outstanding performance as an insoluble acid for catalytic reactions. A constant quality-control check on its physical and chemical properties reveals a minimum of breakage, even under extreme conditions.

Ion exchange resins are employed commercially for catalyzing the epoxidation of unsaturated oils to produce superior plasticizers and stabilizers. Other catalytic reactions for which ion exchange resins have demonstrated unique advantages include esterification, hydrolysis, condensation, sucrose inversion and alcohol dehydration.

Combining all the advantages of a solid, substantially insoluble catalyst, Dowex 50W is easy to separate by filtration or decantation after the reaction is completed; reduces operating costs by its ability to be reused repeatedly—without regeneration; minimizes corrosion problems; increases yields and efficiency. As an extra cost-saving benefit, the resins can be supplied in the hydrogen form for use without special preparation. Less than 50 pound quantities of the Dowex resins are available as "Baker Analyzed" Reagent Dowex Ion Exchange Resins, from the J. T. Baker Company of Phillipsburg, New Jersey, or the Baker distributor in your area.

A hard-cover handbook, "DOWEX: Ion Exchange", covering the entire field of ion exchange from basic principles to processing applications, is yours upon request. Take this opportunity to add to your library of Dow technical literature with this comprehensive, informative 75-page volume.



Crystal-clear, uniform beads of Dowex 50W—the end result of Dow's search for a high-capacity, high-stability ion exchange resin to serve in catalytic reactions.

INTERMEDIATE PRODUCTION FACILITIES: *"short order" service for building blocks*

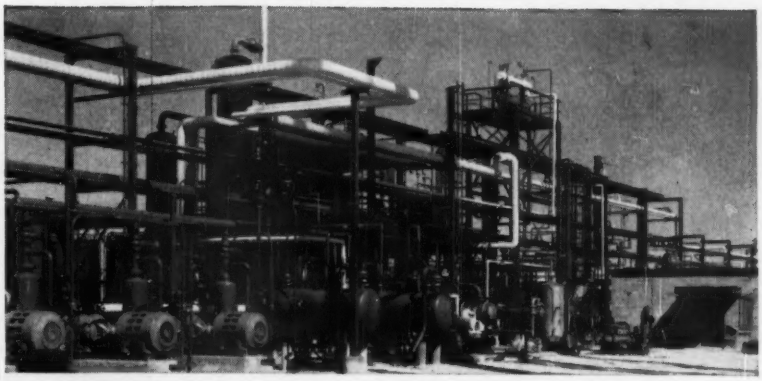
The fanfare that accompanies the announcement of a new intermediate is often followed by a frustrating wait for the product to be made available in commercial quantity. In reality, this time lag between research and full-scale production is necessary for the manufacturer to develop his product and evaluate its market potential.

To help bridge this gap for chemical processors who want to start testing immediately and set up pilot production of their own, Dow has established a new multipurpose plant. The sole function of this plant will be to supply semi-commercial quantities of pharmaceutical intermediates prior to their introduction as regular products.

Later, these "short order" intermediates, like the high-quality basic chemicals in the Dow line, can be supplied in abundance from regular production facilities.

★ ★ ★ ★ ★

IF THESE NEWS NOTES about processing chemicals are helpful we'd like to have your comments. For more information about any Dow chemical discussed in this advertisement, write THE DOW CHEMICAL COMPANY, Midland, Mich., Chemicals Merchandising Department 914AM6-13.



CHELATION: *The specialty that became a commodity.*

Another chemical phenomenon, chelation—like ion exchange—is being recognized as a key problem solver in the chemical processing industry.

Time was, when the process of removing metal ions from water or liquids was just too expensive for many industries and applications. Then along came greater production of chelating agents—like Versene®, Versenol®, and Versenex* from Dow—with subsequent lower cost.

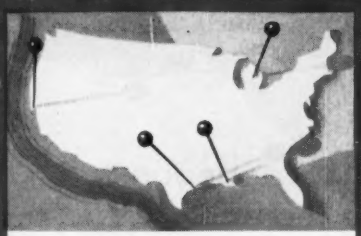
The soap, rubber, paper, formulation, and medical fields all contributed to an expanding market for chelating agents.

And more recently, the economics of chelation have begun to look even better. Because of Dow's new production facilities at the Freeport, Texas plant, the price of Versene, Versenol and Versenex has become much more attractive and many manufacturers are taking a second look at chelating agents as an end to their problems of metallic contamination.

New and different applications are becoming commonplace. Typical is the recent upsurge of interest in scale removal from boilers and heat exchange equipment by chelation.

*TRADEMARK OF THE DOW CHEMICAL COMPANY

MORE NEWSTIPS *for chemical processors*



CAUSTIC SODA

Dow service and delivery are unsurpassed! Plaquemine, La., caustic plant is the fourth in the nationwide network producing this important basic chemical.



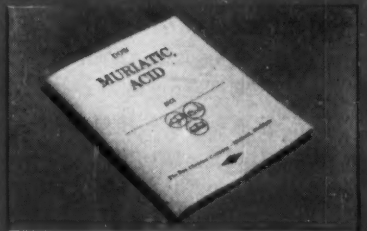
DOWTHERM® A

Pinpoint temperature control—350°F. to 750°F.—is possible with this unique organic heat transfer medium. Reduces fire risk; cuts pressure to 95 psi at 700°F.



METHOCEL®

Water soluble gums with lowest residual ash of any natural or synthetic gum commercially available, have value in metallurgical, ceramic, glass industries.



MURIATIC ACID

Dow's research experience, fast delivery, and technical service ensure satisfaction for HCl customers. Send for informative new Muriatic Acid booklet.

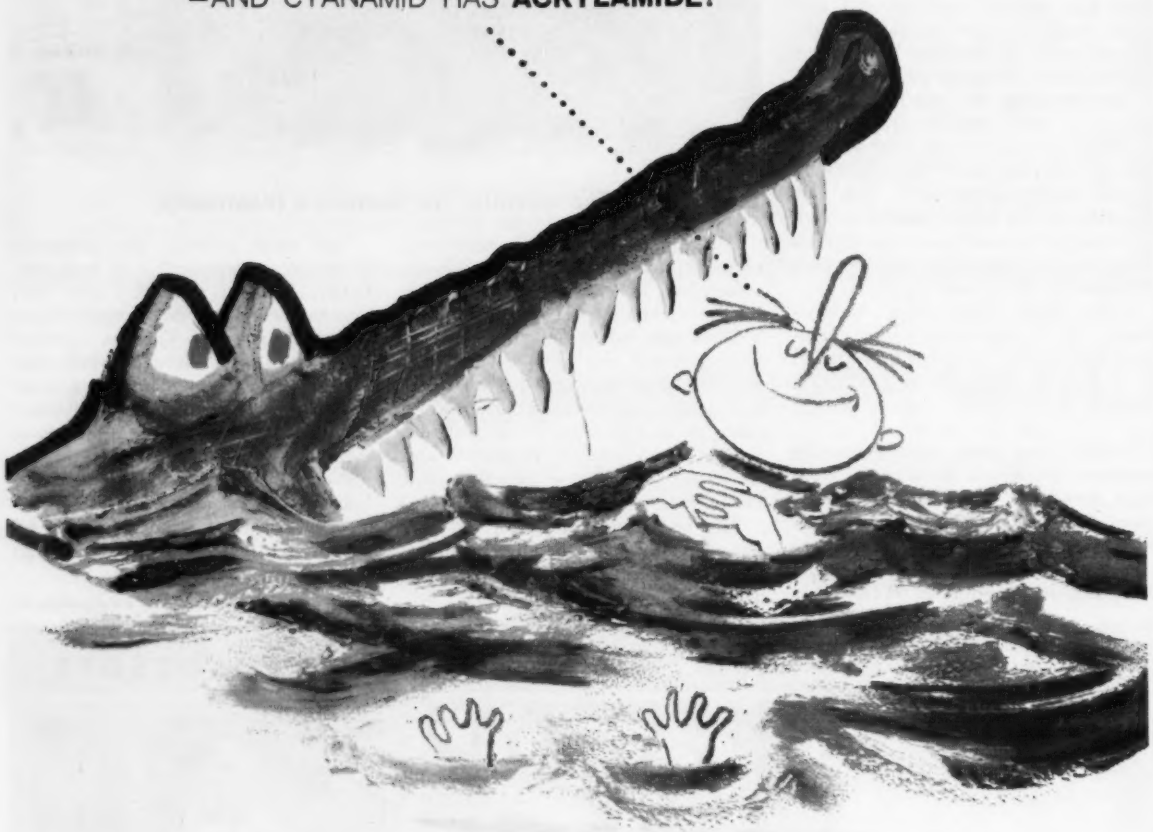
DOW CHEMICALS *basic to the chemical processing industry*

Alkylene Oxides • Glycols • Industrial Preservatives • Polyalkylene Glycols Glycol Ethers • Alkalies • Phenolic Compounds • Brominated and Chlorinated Aliphatic Compounds • Inorganic Acids • Halogens • Organic Acids and Esters Inorganic Chlorides • Bromides and Bromates • Nitrogen Compounds • Amino Acids Glycerine • Salicylates • Phenyl Phosphates • Heat Transfer Media • Flotation and Flocculating Agents • Chelating Agents • Ion Exchange Resins • Methylcellulose Magnesium • Plastics • Aromatics

THE DOW CHEMICAL COMPANY
Midland, Michigan

DOW

...WATER-SOLUBLE **ACRYLAMIDE** MONOMER
HAS FASCINATING APPLICATION POSSIBILITIES
—AND CYANAMID HAS **ACRYLAMIDE!**



Finding "troubled waters" in developing aqueous polymer systems? Acrylamide may be the answer. Water-soluble or water-sensitive polymers, many of which lead to insoluble films, are based on Acrylamide. Cyanamid has Acrylamide—and the right kind of information.

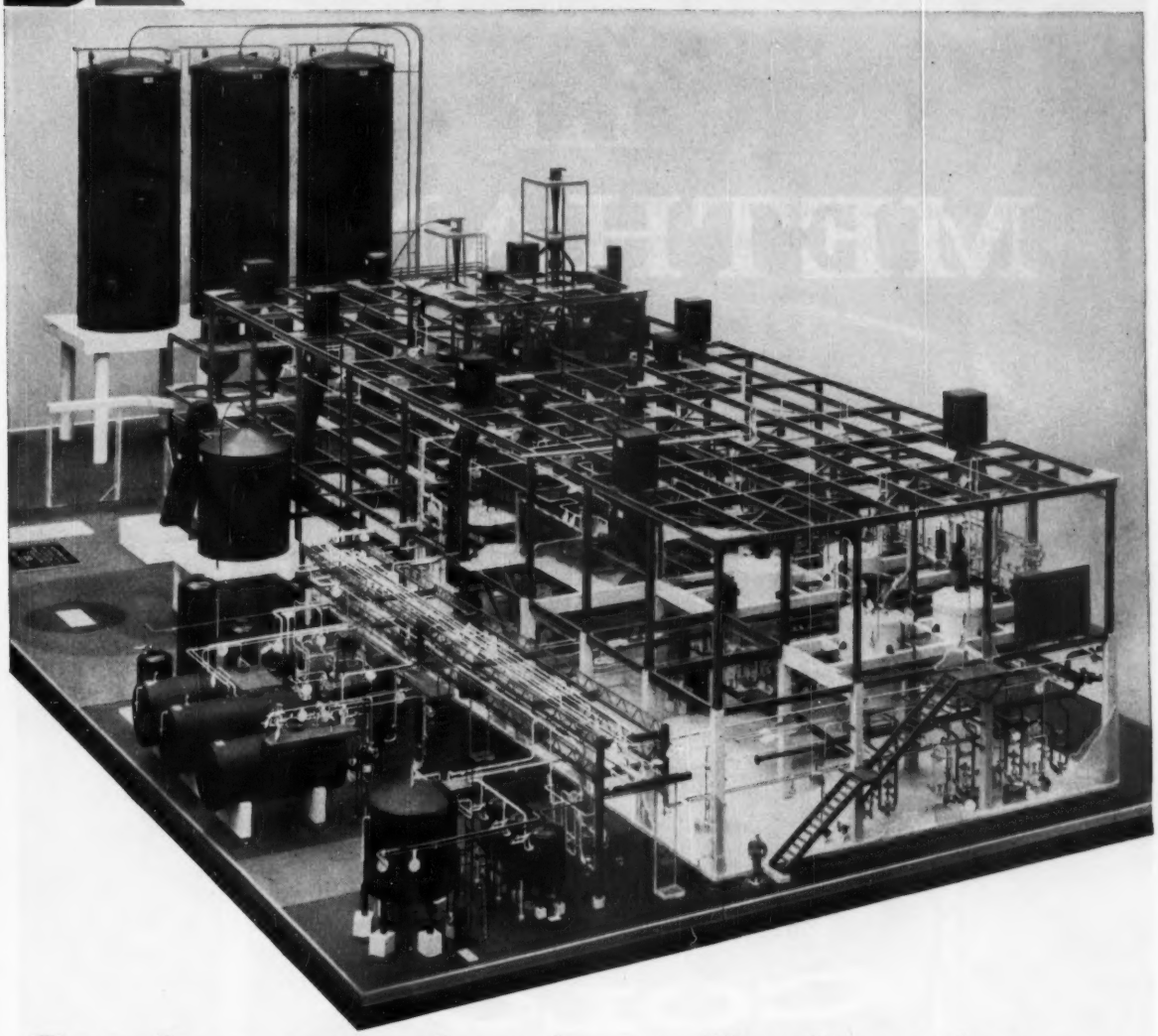
AMERICAN CYANAMID COMPANY CYANAMID

Petrochemicals Department, 30 Rockefeller Plaza, New York 20, N. Y.

ACRYLAMIDE FROM ACRYLONITRILE
... AND THE BIG PRODUCER OF
ACRYLONITRILE IS CYANAMID!



Blaw-Knox designs and builds Cosden's polystyrene plant. Builder of over 90 plastics and resins plants, Blaw-Knox is a leading contractor for this industry's most progressive projects.



Cosden cut pipe installation time by two months with this model

Compared with equivalent projects using conventional design-construction methods, Blaw-Knox's unique model approach builds a plant faster, and at lower cost.

Blaw-Knox makes maximum use of a model as a working tool—to improve visualization, to minimize material and labor costs, and to permit faster field erection without further drafting in the field.

See how this engineering ingenuity can pay off on your next plant or process project. Contact Blaw-Knox Company, Chemical Plants Division with headquarters in Pittsburgh. Branch offices in New York; Haddon Heights, N. J.; Washington, D. C.; Birmingham; Chicago; and San Francisco.

plant builders for industry... BLAW-KNOX



On the Pt-Co color scale Allied Methanol rates 5 maximum – a degree of sparkling clarity unequaled by your drinking water. In pharmaceutical and other fine chemical applications this freedom from color is one measure of the purity of Allied Methanol. Maximum non-volatile residue of 0.001% is another.

Allied Methanol is shipped in barges, tank cars and tank trucks from the South Point, Ohio plant and from strategically located stocks in principal cities. Nitrogen Division's technical service staff is always at your call.

For specifications and local offices, see our insert in Chemical Materials Catalog, pages 435-442 and in Chemical Week Buyers Guide, pages 35-42.

BASIC TO AMERICA'S PROGRESS

Allied Chemical

NITROGEN DIVISION
Dept. M 2-7-7 40 Rector St., New York 6, N. Y.

2819

Business
Newsletter

CHEMICAL WEEK
June 13, 1959

Latest evidence of CPI opportunities in underdeveloped countries (*see also p. 27*): the move by Von Kohorn International (White Plains, N.Y.) to launch nylon production in India.

The U. S. company and its British and Indian affiliates will engineer, build, and start up a $3.8-million nylon-6 yarn plant near Bombay. It will be owned by a new company, Nanubhai Industries Private Ltd. Subscribers include Von Kohorn ($241,500), The Financial & Development Fund of New York ($499,800), and a group of Indian investors, including the firm's founder, industrialist-jeweler Nanubhai Jhaveri, and six maharajas. U. S. investors will be offered common stock worth about $300,000. Von Kohorn will also provide about $1 million in long-term credits for the equipment, will receive $221,550 for technical services.

Initial capacity of the plant, two metric tons/day (1.6 million lbs./year), will supply about 80% of India's nylon yarn requirements for wearing apparel. (Imports in '58: an estimated 2 million lbs.) Plans call for expansion to 3 tons, eventually 5 tons/day, when the group will put up a caprolactam plant to supply raw material. Production is slated to get under way in '61. If all the output is sold domestically, estimated sales on the first year of operations will be $8.1 million; net profit, $2.8 million.

This will be the third Von Kohorn-built fiber plant in India. The company has already put up two rayon plants. And in Russia, Von Kohorn has just won a contract to build a viscose plant (*see p. 37*).

•

But many U. S. chemical industry men are still dead-set against selling technology to Russia. In a talk prepared for this week's Manufacturing Chemists' Assn. meeting, for example, Esso Vice-President Osgood Tracy warns that Russia wants U. S. chemical know-how as a crucial weapon in its economic war on the West. U.S. industry, he says, "must not surrender its advanced processes and equipment to the Soviet Union."

•

Companies continue to see booming prospects for plastic films—and are building fast to cash in on them (*see also p. 38*).

W. R. Grace's work on $2-million expansion of its Simpsonville, S.C., plant has already started; completion date: '61.

Dow is blueprinting a $2-million polyethylene film unit in Fresno, Calif., with construction to start this summer. Operating it will be Extruders Inc., a Dow subsidiary acquired in '58. Extruders has been turning out film at Hawthorne, Calif., but will vacate that plant.

Dow is also teaming with Pacific Chemical & Fertilizer Co. (Honolulu) to form a new company in Hawaii, Hawaiian Extruders Inc., to make polyethylene film and film products. The Hawaiian firm will take over a small plant formerly owned by Wilson Products Co.

And Studebaker-Packard Corp. (South Bend, Ind.) has diversified with purchase of Gering Products, Inc. (Kenilworth, N. J.), a producer of plastics, polyethylene film and plastic hoses. Gering will be operated as a separate division of Studebaker-Packard.

Some film markets, however, might be jeopardized by the growing death toll of small children suffocating after pulling thin plastic bags over their heads. Fatal accidents have caused state and local legislatures to introduce bills regulating the use of a number of the bags—although most set up only one requirement: warning labels must be attached (*see also p. 86*).

•

The boom is still on for pharmaceuticals.

In the nine months ended March 31, Vick Chemical boosted sales 3.7%, to an all-time high of $89.3 million. Earnings in the same period were up 15.6%, to a record $10.4 million.

Carter Products posted sales of $13 million in the quarter ended March 31, compared with $11.1 million in '58. After-tax net rose to $1.8 million vs. $1.6 million last year. For its fiscal year, also ended March 31, Carter chalked up earnings of $7 million on sales of $48.1 million. Corresponding '58 figures: $5.6 million and $42.5 million.

•

Mallinckrodt Chemical is almost ready for an acquisition. Stockholders this week approved the firm's plan to offer $6 million in convertible debentures early this summer and increase authorized Class A common stock from 360,000 to 720,000 shares. Mallinckrodt will say only that it is studying several businesses "in areas related to the company's business." One likely guess: nuclear materials processing.

•

Chemical companies have trimmed their capital spending plans. Petroleum refiners, too, are revising their '59 capital budget downward, although other process industries—and manufacturing in general—are boosting their expenditures for new plant and equipment. The government's quarterly survey—out this week—suggests that makers of chemicals and allied products are more concerned about overcapacity than they were in February, when they indicated that this year's capital spending would amount to $1,414 million, up 7.1% from '58. The new reading: only $1,262 million. The chemical industry's more cautious attitude on '59 budgets was also indicated in a private survey released last week (*see also p. 40*).

•

Dow Chemical is moving deeper into the antifreeze business. Now the second-largest producer of ethylene glycol (prime antifreeze ingredient), Dow plans to test-market an antifreeze under its own name this fall. Several market areas—not yet selected—will be used.



METHANOL... Large scale production controlled to the highest purity, plus over 50 years experience in the manufacture of organic chemicals, makes Heyden Newport an important source for this versatile alcohol.

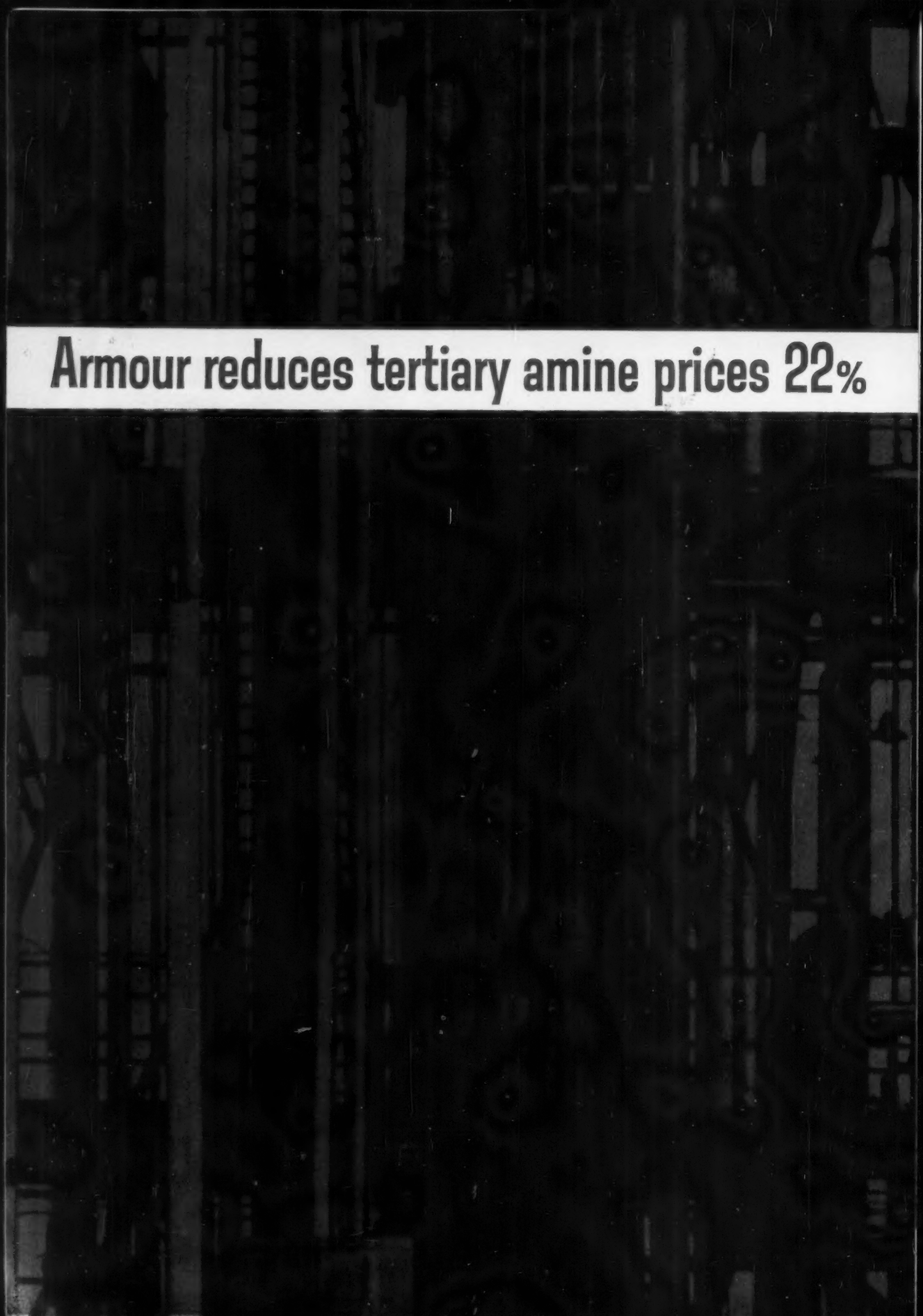
District sales offices located in the nation's major distribution areas will service your methanol requirements promptly from... California, 1001 E. First Street, Los Angeles 12; 420 Market Street, San Francisco 11... Georgia, 254 Paces Ferry Road, Atlanta 5 ... Illinois, 20 North Wacker Drive, Chicago 6... Michigan, 10600 Puritan Avenue, Detroit 38... New Jersey, 1 Virginia Street, Newark 12... New York, Main Office, 342 Madison Avenue, New York 17... Ohio, 1433 East McMillan Street, Cincinnati 6... Pennsylvania, 7 Wynnewood Road, Wynnewood... Rhode Island, 511 Westminster Street, Providence 3 ... Texas, 2444 Times Boulevard, Houston 5. 1956

FINE HEYDEN CHEMICALS®

HEYDEN CHEMICAL DIVISION

Heyden Newport Chemical Corp., 342 Madison Ave., New York 17, New York

HEYDEN NEWPORT®


Armour reduces tertiary amine prices 22%

New production facilities are now turning out commercial quantities of both high purity alkyldimethyl and dialkylmethyl tertiaries at a saving of 13¢ to 25¢ per pound!

Here are economical cationic starting materials for a wide range of new products and processes. The entire series sets new industry standards for these commercial chemicals in tertiary amine content and color, making them extremely useful in many surfactant applications.

Armeens® DM18D, DM16D, DMSD, DMCD and DMHTD are Armour's series of alkyldimethylamines with the following configuration:

$$R\text{-}N\begin{matrix}CH_3\\CH_3\end{matrix}$$

Armeen M2HT is a long-chain dialkylmethylamine with this configuration:

$$\begin{matrix}R\\R\end{matrix}\!>\!N\text{-}CH_3$$

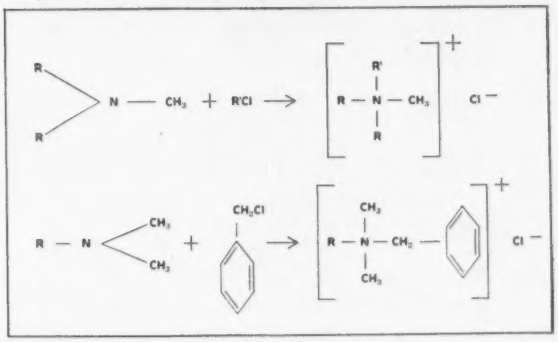
"R" represents the alkyl chains from tallow, coco, soya or the indicated long-chain fatty acids.

Applications:

Quaternaries. Quaternaries made from Armour tertiary amines are used as bacteriostats, germicides, emulsifying agents, textile softeners, and in other applications. And because Armour tertiaries are now reduced in price, processors will find it profitable to make their own quaternaries—particularly those of the benzyl type!

Manufacturing quaternaries from either the dialkylmethylamines or the alkyldimethylamines is a straight-forward process yielding products with a wide range of properties. Your choice of alkylating agent will determine the effectiveness of the quaternary for a specific application. The alkyldimethylamines yield water soluble quaternaries while the dialkylmethylamines produce quaternaries that are oil soluble and water dispersible.

The following are typical reactions with alkyl or alkylaryl halides to form quaternary ammonium salts.



Lube oil additives. The ability of Armour's tertiaries to form amine salts with organic and inorganic acids indicates a high potential as acid scavengers and defoamers in motor oils.

Polyurethane. Armour's high molecular weight tertiaries have proved to be excellent catalysts in manufacturing polyurethane foams. Armeen DM16D, for example, pushes foam reaction faster than N-methyl morpholine. All the Armeens exhibit relatively fast rates of catalysis.

The tertiaries also impart distinctive cell uniformity, reduce foam shrinkage, and increase load-bearing capacities. They are economical to use and can be dispersed easily into "one-shot" systems or "prepolymer" systems by proper machine-head agitation.

Send the coupon for samples and a copy of Armour's new Tertiary Amine Booklet. Test these low cost, versatile chemicals in your own operation. And if you have a specific problem, write us. Our research staff welcomes the opportunity to help you.

FIND OUT MORE ABOUT ARMOUR'S TERTIARY AMINES!

ARMOUR CHEMICAL DIVISION

Leader in progressive fatty acid chemistry
1355 West 31st Street · Chicago 9, Illinois
© Armour and Company

Send me a copy of the new Tertiary Amine Booklet ☐
Send samples and further information about this application:

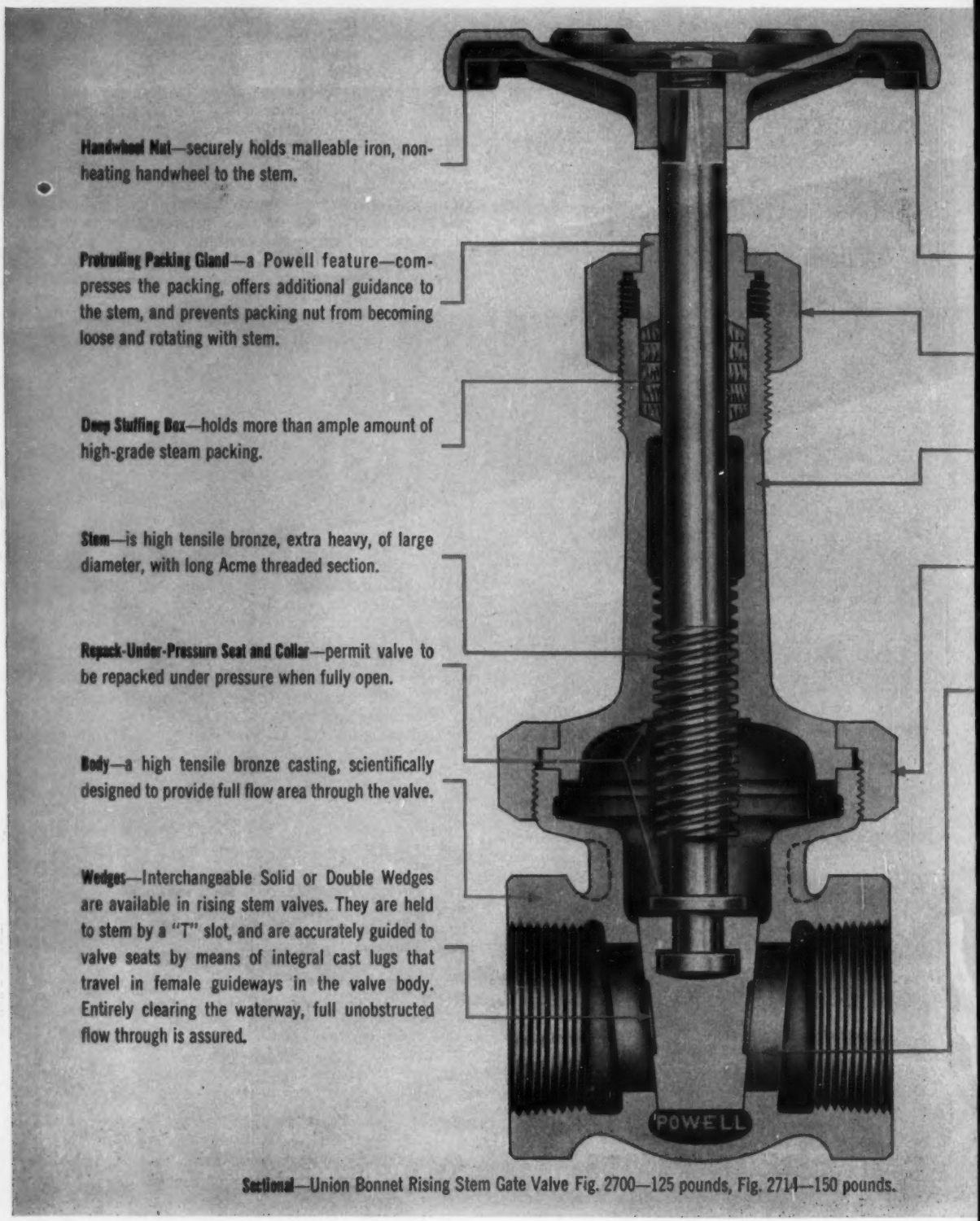
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NAME_____
POSITION_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____

CW-6-59

ANNOUNCING NEW **POWELL**



Sectional—Union Bonnet Rising Stem Gate Valve Fig. 2700—125 pounds, Fig. 2714—150 pounds.

POWELL...world's largest family of valves

BRONZE UNION BONNET GATE VALVES

for 125 and 150 pounds WSP

These new BRONZE Union Bonnet Gate Valves have many superior features—some of which are outlined here. For complete details, write for new illustrated circular. Or check with your nearest Powell Valve distributor.

Identification Plate—gives Figure Number and kind of valve.

Heavy Hexagonal Packing Nut—for holding gland and adjusting packing.

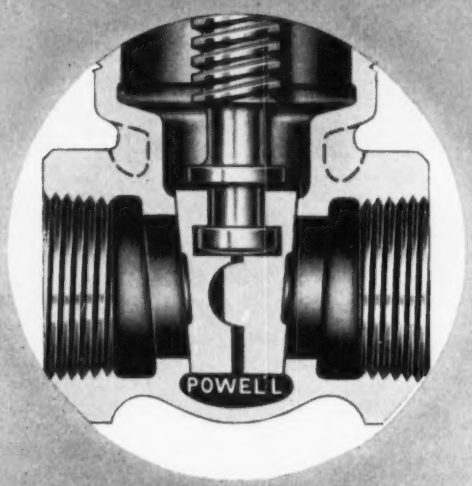
Long Bonnet—cast of high tensile bronze for long service.

Octagonal Ring Nut—is deep threaded and tightly holds body-bonnet connection. Affords additional wrenching positions.

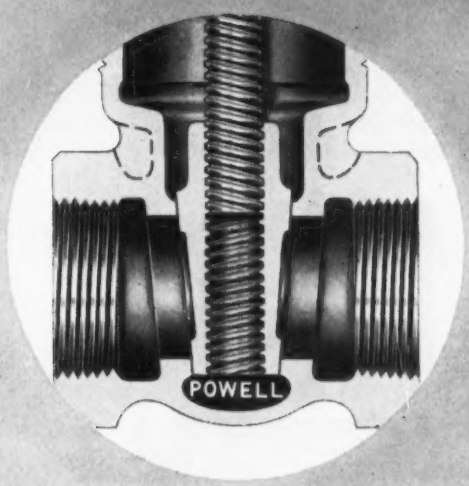
Ample Space—between seats and end of pipe thread prevents injury to seats when screwing pipe into the body.



Fig. 2707—125-pound Union Bonnet Non-Rising Stem Gate Valve. Also available for 150 pounds—Fig. 2712.



Detail of Sectional View Inside Screw Rising Stem Gate Valve showing Double Wedge Disc and Integral Seats.

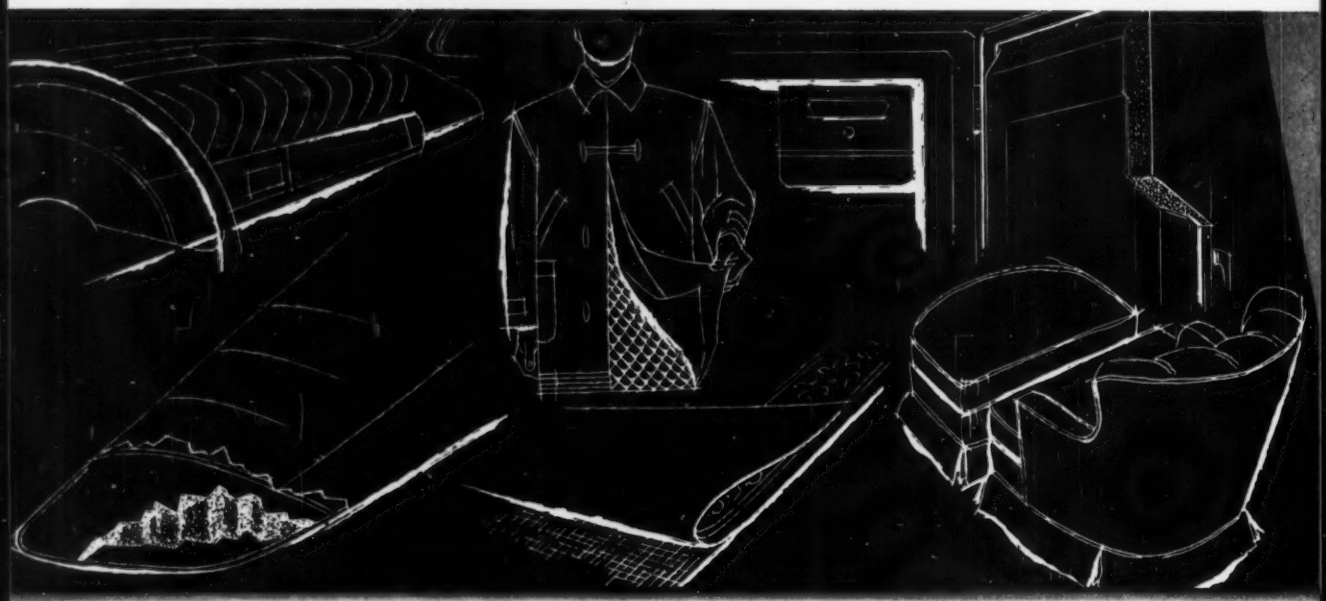


Detail of Sectional View Non-Rising Stem Gate Valve showing Solid Wedge Disc that rises on stem. Integral Seats.

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

TRIMETHYL

Celanese high volume production and low price...putting bounce in urethane foams and coatings industries



Left to right:

- CRASH PADDING
- AIRCRAFT CONSTRUCTION
- CLOTHING INTERLINERS
- RUG UNDERLAYS
- REFRIGERATOR INSULATION
- FURNITURE CUSHIONING
- AUTOMOBILE CUSHIONING
- PROTECTIVE PACKAGING
- MATTRESSES AND PILLOWS
- ARCHITECTURAL PANELS

OLPROPANE

To make urethane foam, rigid or resilient, you need a polyol. This is where an increasing portion of Celanese' 15 million lbs. capacity of trimethylolpropane is going, and where the Celanese low price is helping manufacturers of urethane foams and coatings to flatten costs and meet the competition of other materials.

The same with alkyd resins—another end use where Celanese trimethylolpropane's high production and low price have enabled paint and coatings manufacturers to plan ahead with more confidence.

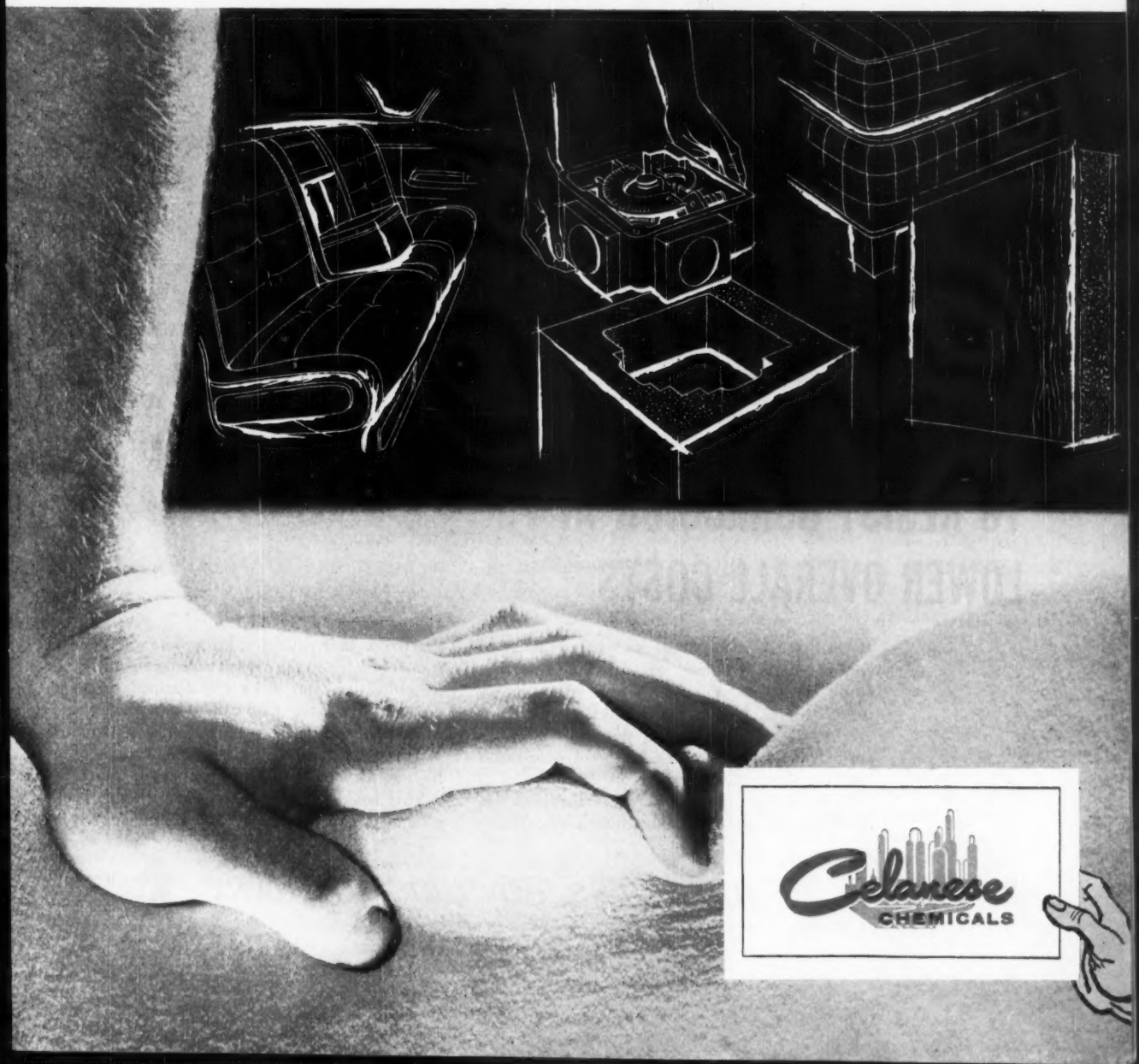
Giving dependability to your raw material supply source is a continuing program at Celanese.

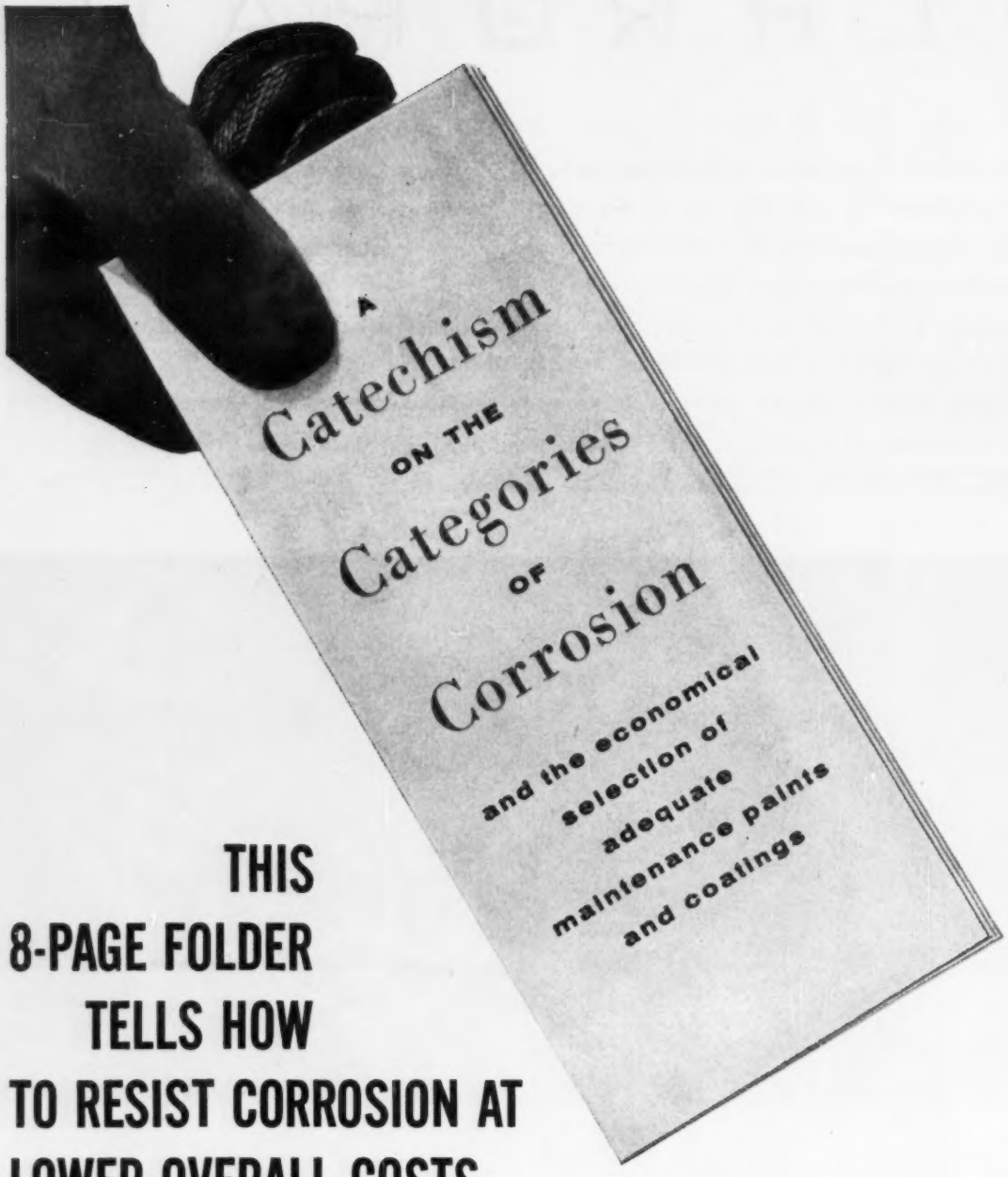
Celanese Corporation of America, Chemical Division, Dept. 652-F 180 Madison Ave., New York 16.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

Celanese®





THIS 8-PAGE FOLDER TELLS HOW TO RESIST CORROSION AT LOWER OVERALL COSTS

If you have anything to do with maintenance of equipment or structure, or with the costs that result therefrom, this folder may be extremely useful to you. It gives a rational basis for paint and painting specifications, and tells how all surface and area exposures can be classified into the Four Categories of Corrosion.

As in all other phases of engineering, both underdesign and overdesign of maintenance painting carry economic penalties. Either one will show up sooner or later on the overall cost sheets. Although Hercules does not make any finished paints or coatings, we have had over twenty-five years' practical experience with Parlon® chlorinated rubber, a key material for corrosion-resistant and high-performance maintenance paints.

This booklet has been written with this background of experience. Write for your copy.

Cellulose Products Department

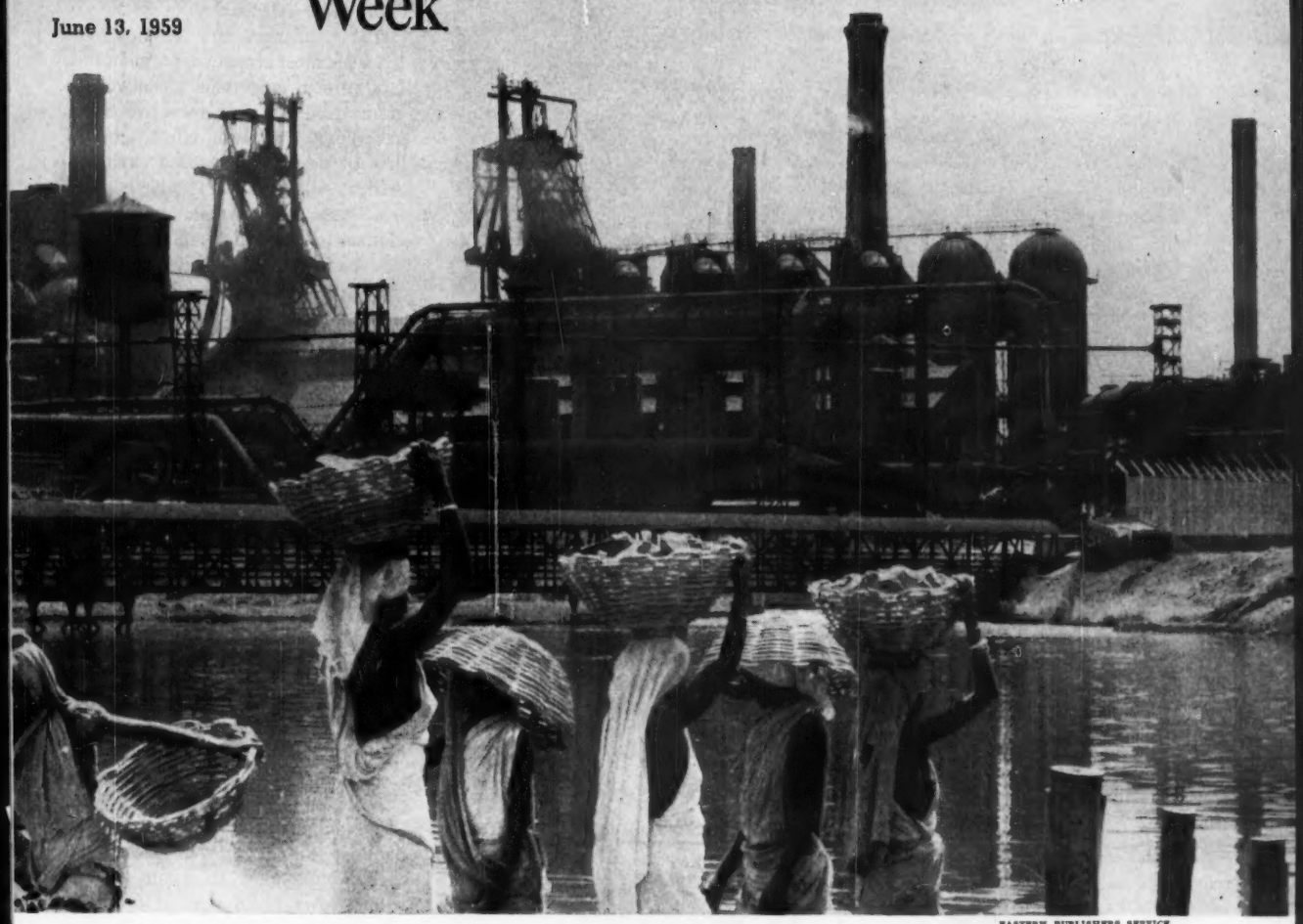
HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

CR 59-5

Chemical Week
June 13, 1959



EASTERN PUBLISHERS SERVICE

Contrasts in India: Changing attitudes toward foreign capital presage similar scenes elsewhere.

Exploring the CPI's New Frontiers

Changing foreign attitudes toward U.S. private capital, new U.S. government incentives are expected to uncover $25 billion worth of investment opportunities in underdeveloped countries for American businessmen.

AT Veraval, India, this month, construction is scheduled to begin on a $7-million, 10-tons/day rayon filament plant of Indian Rayon Corp. Ltd., a joint venture of Von Kohorn International (White Plains, N.Y.) and a syndicate of Indian industrialists. In the Union of South Africa, design work and site selection are under way for a 22-million-lbs./year oil blacks plant of Phillips Carbon Black Co. (Proprietary) Ltd., a joint venture of Phillips Petroleum Co. and Industrial Development Corp. of South Africa Ltd. And in Jerusalem, Israel, a group of American investors recently have formed Israel Investors Corp. as the first step in the purchase of Israel's largest chemical firm, Fertilizers and Chemicals Ltd.

These ventures epitomize the steadily growing flow of private U.S. direct investments into less-developed countries (*see tables*). They also signify a changing attitude toward private foreign investments by these countries.

Principal feature of the change: prejudices against outside private capital investments are wearing down, particularly as foreign governments encounter mounting difficulties in raising capital for public works and industrial development.

President Frondizi's Argentina is a noteworthy example of a country that has done an important about-face in attitude toward private foreign investments. The governments of Iran and Pakistan have embarked upon programs to divest themselves of inefficient state-owned enterprises. In Burma and Indonesia, there are signs that hostility toward private foreign capital is softening. And the new nations of Africa, typified by Ghana,

Underdeveloped areas get half of U.S. firms' direct foreign investments

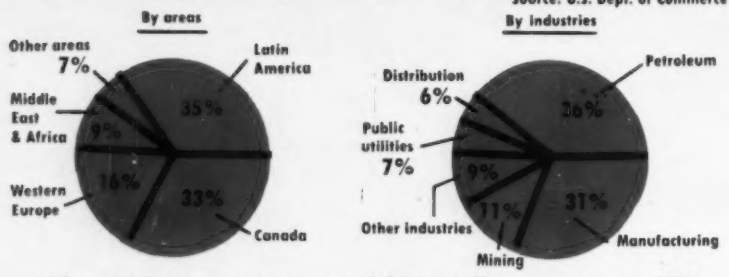
Book value of private investments in millions of dollars

	1950				1957			
	Total	Petrol.	Mining & smelting	Other (incl. chem.)	Total	Petrol.	Mining & smelting	Other (incl. chem.)
Middle East	731	692	11	28	1,284	1,177	9	98
Africa[1]	107	52	31	24	319	134	111	74
Far East[2]	320	120	11	189	716	307	19	390
Latin America[3]	4,445	1,233	628	2,584	8,308	2,861	1,238	4,209
W. Hemisphere (other)[4]	131	70	38	23	339	190	75	74
Totals	**5,734**	**2,167**	**719**	**2,848**	**10,966**	**4,669**	**1,452**	**4,845**

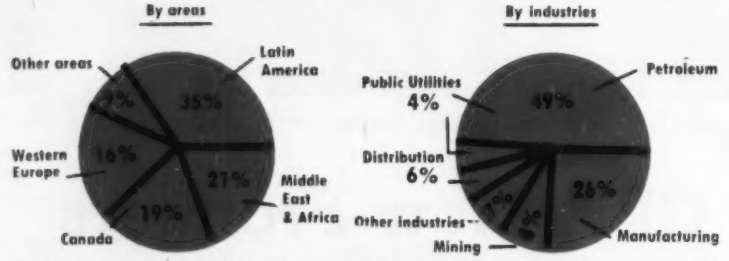
(1) Excludes estimated value of ships registered in Liberia, excludes Union of South Africa.
(2) Excludes Japan, Australia, New Zealand.
(3) Excludes estimated value of ships registered in Panama.
(4) European dependencies in Western Hemisphere.
Source: U.S. Dept. of Commerce

Input and return on direct foreign investments

Source: U.S. Dept. of Commerce



Where U.S. companies invested $25.3 billion overseas in '57



Breakdown of $3.3 billion earned from overseas investments in '57

Growth of U.S. private investments in underdeveloped countries

U.S. investments in millions of dollars

	'50	'53	'55	'56		'57	
				Total	Mfg. only	Total	Mfg. only
Cuba	642	686	736	777	66	850	80
Central America, Dominican Republic, Haiti	722	835	938	1,030	36	1,132	39
India	38	68	95	108	33	110	36
Indonesia	58	88	86	118	24	150	24
Liberia	82	186	277	334	—	380	—
Philippines	149	188	229	267	35	307	41
Union of South Africa	140	212	259	288	94	305	108
	1,831	2,263	2,620	2,922	288	3,234	328

Source: U.S. Dept. of Commerce

seem receptive to private investment —on paper at least.

These changes are all-important. Even the most ardent supporters of the U.S. foreign investment incentive program agree that such incentives won't have much short-term effect upon the flow of desperately needed capital to Africa, Asia and the Middle East unless those areas create a favorable climate for foreign capital.

Defining Investment Potential

The sheer size of the industrial development problem in the underdeveloped non-Communist countries, paradoxically, holds great investment promise. Government economists are using the following rough yardstick to gauge the magnitude of the potential opportunity:

If they are not to fall further and further behind the standard of living of the advanced nations, the underdeveloped countries must come close to a 7% annual growth in gross national product.

This is a political must. If the peoples of those nations conclude that the gap in living standards is steadily widening, a political stampede to Communism would appear to be inevitable at some stage.

To achieve 7% increase in gross national product each year, those countries would have to count on an annual level of investment of somewhere around 20% of GNP. The combined GNP of the underdeveloped Western countries is about $200 billion. This means that the annual investment needed to start closing the gap between the haves and have-nots is something like $40 billion/-year.

Total internal investment in those countries is probably around $10 billion/year now. Foreign investments —public and private—probably add another $5 billion. The present gap, then, is a staggering $25 billion.

This doesn't mean that Africa, Asia and the other areas in question are going to go Communist next year, or even within the next decade, if the $25 billion/year in development capital is not forthcoming. It does, however, indicate that if the capital flow to the underdeveloped countries is not markedly increased over the next generation, the West stands to lose the economic cold war.

If the U.S. alone devoted about

7% of the country's gross national product to foreign investment (as Britain did in the 19th century), it would be pumping more than $30 billion/year overseas—instead of the approximately $4 billion it now exports in the form of direct private investments.

Know Your Area

In areas of potential interest to U.S. investors, opportunity is often tempered by local conditions.

Africa is a significant case in point. If the Inga power project in the Belgian Congo, the Volta project in Ghana and the big hydro scheme in Guinea all pan out, major new opportunities would be created for aluminum production in all three places.

Rapidly developing South Africa presents attractive possibilities, with considerable U.S. capital already invested there (*see table*). The outlook is somewhat dimmed by continuing menace of racial strife.

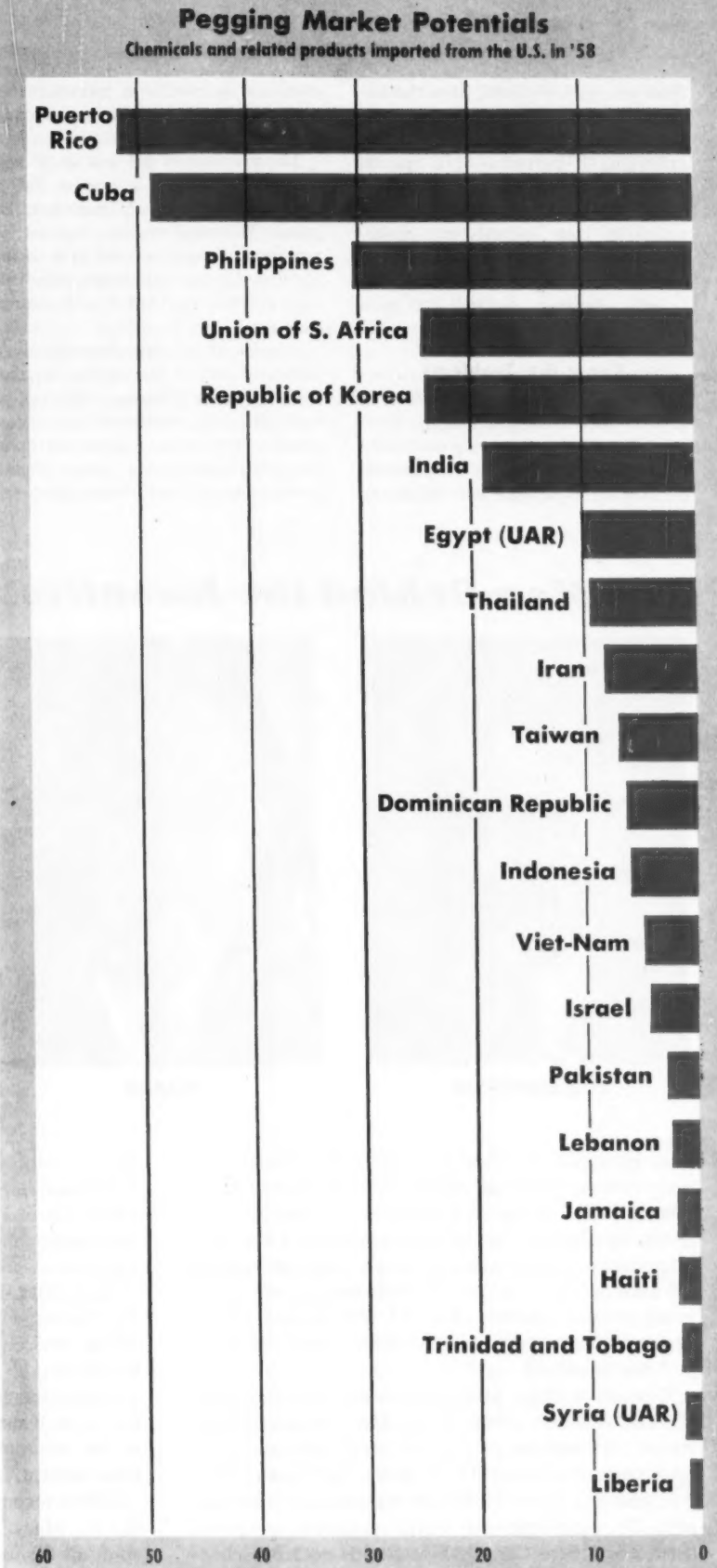
In North Africa the big obstacle is the seemingly endless war in Algeria, which makes the climate uncertain from Morocco to Libya. But if this were settled, and French President de Gaulle's ambitious plan for economic development could be launched, opportunities would open rapidly.

The unfolding political drama in the Philippines might well have a marked effect on future opportunities for U.S. investors. Reports McGraw-Hill's World News Manila Bureau, "There's a rising wave of nationalism being carefully cultivated by the present Administration, openly aimed at the Westerners here, particularly Americans."

A shortage of dollars, the constant threat of new legislation that would strip U.S. investors of their favored position—which is on a par with that of Philippine citizens in most economic fields—are adverse factors.

The situation in Cuba is similar. Fears of nationalization have gripped U.S. firms operating there. But, at least one international business consultant, S. J. Rundt (S. J. Rundt Associates, New York), tells *CW* that Cuba's economic ties with the U.S. will have to improve. "There's one factor no one can change," he says, "not even Dr. Castro—Havana is one hour away from Miami. The U.S. will remain Cuba's main trading partner."

Rundt, who lists a number of CPI



firms among his clients, cites the importance of studying a potential market as a broad economic entity before examining it in terms of a specific product or service. He says, "No company can work successfully abroad unless its own interests are closely linked to the national aspirations and popular wellbeing of the country. This is good business as well as good ethics."

Know the Problems

Despite the brightening outlook in several underdeveloped nations, prospective investors are being cautioned by the experts to go slow. This counsel is based on experience with the many obstacles to profitable investment in underdeveloped nations, particularly the newly independent.

Many countries are too small and too poor to offer a market for a profitable volume of manufactured goods. The trend towards regional integration of markets (such as is taking place in Central and South America) may correct this, but it will take a long time.

Almost all of the underdeveloped countries suffer in varying degrees from shortages of foreign exchange or local financing, skilled labor, managerial and technical talent, and basic physical facilities—e.g., power, roads, ports, railroads and communications.

Taxes are another serious impediment. Two-thirds of the less-developed countries studied in the Straus Report (*see p. 31*) have tax rates of more than 35% on foreign investments. Ceylon, India, Israel, Pakistan and Burma have higher rates than the U.S. High taxes frequently do not permit a margin of profit that can compare with the high-profit potentials of the industrialized countries.

But, here again, there are exceptions. With a high tax rate and few resources, Israel has multiplied its exports five times in the past 10 years by following policies favorable to private foreign investment and to foreign trade.

The Men Behind the Incentives Program



BOESCHENSTEIN



AL WAGG

KEARNS



AL WAGG

BOGGS

In principle, the U.S. government has placed "primary reliance" upon private investors to provide development capital to the underdeveloped nations.

But in practice, the policy hasn't worked too well. Although private investment nearly doubled between '50 and '58 (*table, p. 28*), it fell behind growth of the gross national product. Half of U.S. foreign direct investments are in Canada and western Europe, 35% are in Latin America.

Commerce Dept. Move: About two years ago, the Business Advisory Council to the U.S. Commerce Dept. started reviewing the possibilities of new private foreign investment incentives. These efforts culminated early this year in a report to President Eisenhower from the council's committee on world economic practices, headed by Owens-Corning-Fiberglas' Harold Boeschenstein. The report recommended an incentive program.

Commerce welcomed BAC's support. Under the leadership of Henry Kearns, assistant secretary for international affairs, Commerce Dept. had, right along, encouraged private investment where it could.

Rep. Hale Boggs, Louisiana Democrat, prodded the Administration last fall by holding extensive hearings on the subject, forced the Administration's hand again by offering his foreign tax incentives bill this session.

Under Secretary of State C. Douglas Dillon, a businessman himself, has backed the program, swinging as the International Cooperation Administration and Development Loan Fund solidly behind it.

Dillon recommended that Ralph Straus, director of R. H. Macy Co., prepare an exhaustive technical study of the subject. That study has become the basis

Lacking a large population and extensive consumer demand, Israel is capitalizing on its advantages as a production base for exporters.

A private American entrepreneur, for instance, recently liquidated his interests in the U.S., emigrated to Israel, where he put up one of the largest paper carton manufacturing plants in the world. He imports kraft paper in multishipload lots, now is successfully exporting cartons all over southern Europe, South Asia and Madagascar.

In '57 the carton firm accounted for 80% of Israel's $1.7 million worth of paper exports, added 55% in value through manufacturing.

Another source of concern to foreign investors is the tendency of underdeveloped nations to nationalize—rather than regulate—industries that fail to conform to the government's view of the public interest.

Significantly, the insistence of some foreign countries that the government itself be a joint-venture partner in key enterprises has caused many U.S. firms to override traditional objections to becoming partners with public capital. And, to help ensure favorable treatment at the hands of foreign governments, lessen the chance of expropriation, U.S. firms are learning to accept minority interests in joint ventures with public and/or private capital.

The historic attitudes that impede private foreign investment in less-developed countries won't change overnight. But if the West is not permitted to supply the enormous potential capital needs of the underdeveloped nations within a reasonable period of time, these countries are almost certain to turn increasingly to the Soviet bloc—first for financial assistance, later, perhaps, to learn the Communist method—and ideology—of rapid capital formation, at the sacrifice of freedom.

That's the broad picture. For a closeup of the opportunities and problems in one key area, turn page.



WIDE WORLD

DILLON



RICHARD MARSHALL

STRAUS



AL WAGG

DANIELAN

of the Eisenhower Administration's program.

Backing the program is the International Economic Policy Assn.—offshoot of the Great Lakes-St. Lawrence Seaway Assn.—headed by N. R. Danielan and backed by big Middle Western business interests.

Here's where the incentives program stands today:

(1) Support is solidifying for a modified version of the Boggs Bill (*CW, Feb. 28, p. 27*). The bill would permit establishment of "foreign business corporations," which could defer federal tax payments on income earned abroad and grant other tax concessions.

(2) The Administration has asked Congress to double funds (creating a new $1-billion ceiling) for ICA's program guaranteeing foreign investments against inconvertibility, expropriation, war damage.

(3) The Export-Import Bank has been ordered by the National Advisory Council to at least partly guarantee foreign investments against ordinary commercial risks.

(4) DLF is readying new techniques for stepping up indirect financing of projects in underdeveloped territories by guaranteeing commercial loans instead of lending directly. The fund also will liberalize its 50-50 rule under which it has refused to lend more than half of the total cost of a private firm's foreign project.

(5) New high-level offices are being set up in the State Dept., ICA and DLF to more closely coordinate public aid with private foreign investments.

And last week, Dillon again called attention to underdeveloped countries, called on U.S. businessmen to pay less attention to "temporarily unfavorable attitudes," increase private investments.

FOCUSING ON INDIA

Of all the developing nations bidding for U.S. capital, India—the most populous non-Communist country and one of the poorest—has become the most important over-all investment opportunity for the U.S. chemical industry, as well as the pivot of the U.S.-Soviet struggle for Asian allegiance. It's an opportunity U.S. companies are barely beginning to grasp. (Total U.S. private investment by late '58: about $150 million).

So far, the pharmaceutical companies are leading the way. Examples: Pfizer, which last fall acquired controlling interest in a finishing and packaging plant near Bombay, has offered to put up a large basic chemical and pharmaceutical plant. Merck is putting $4.2 million into a joint venture with Tata Sons. And American Cyanamid hopes to expand its Lederle pharmaceutical processing operation with a new fermentation plant.

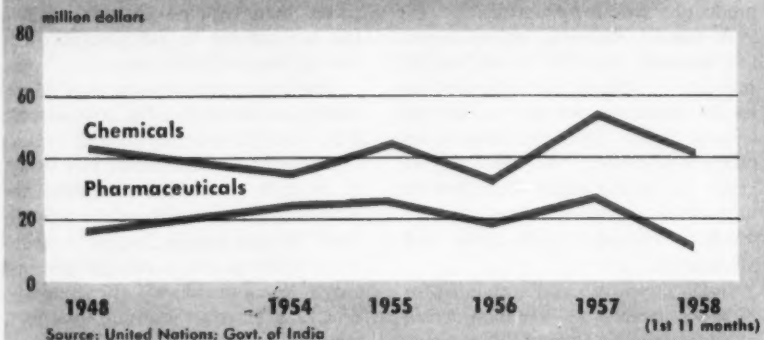
But pharmaceuticals, of course, make up only a part of the chemical products demanded by a country embarked on a forced industrial development program, with a population of 400 million, swelling by about 5 million/year.

India's prevailing poverty hasn't helped promote the image of a promising market. But the country's businessmen point out that, while per capita income is a meager $60, total national income was almost $24 billion in the 1956-57 fiscal year—fifth highest among Western nations. And it's growing at about 4%/year. A good measure of this money is concentrated in the pockets of an expanding middle class—enough of it to boost consumption of such discretionary items as sewing machines and radios by 294% and 393%, respectively, between '50 and '57.

A close look at some of India's imports (*charts, right*) gives a sharper view of the magnitude and variety of the country's chemical needs. But the totals understate the real market, since a foreign-exchange shortage has compelled the government to eliminate all but the most essential imports.

Plotting for Growth: The real guide to chemical investment opportunities in India is the second five-year plan ('56-'61), which lays out goals for over-all economic growth, including development of industry.

Dissecting India's jagged import pattern



Source: United Nations; Govt. of India

India's imports in millions of dollars

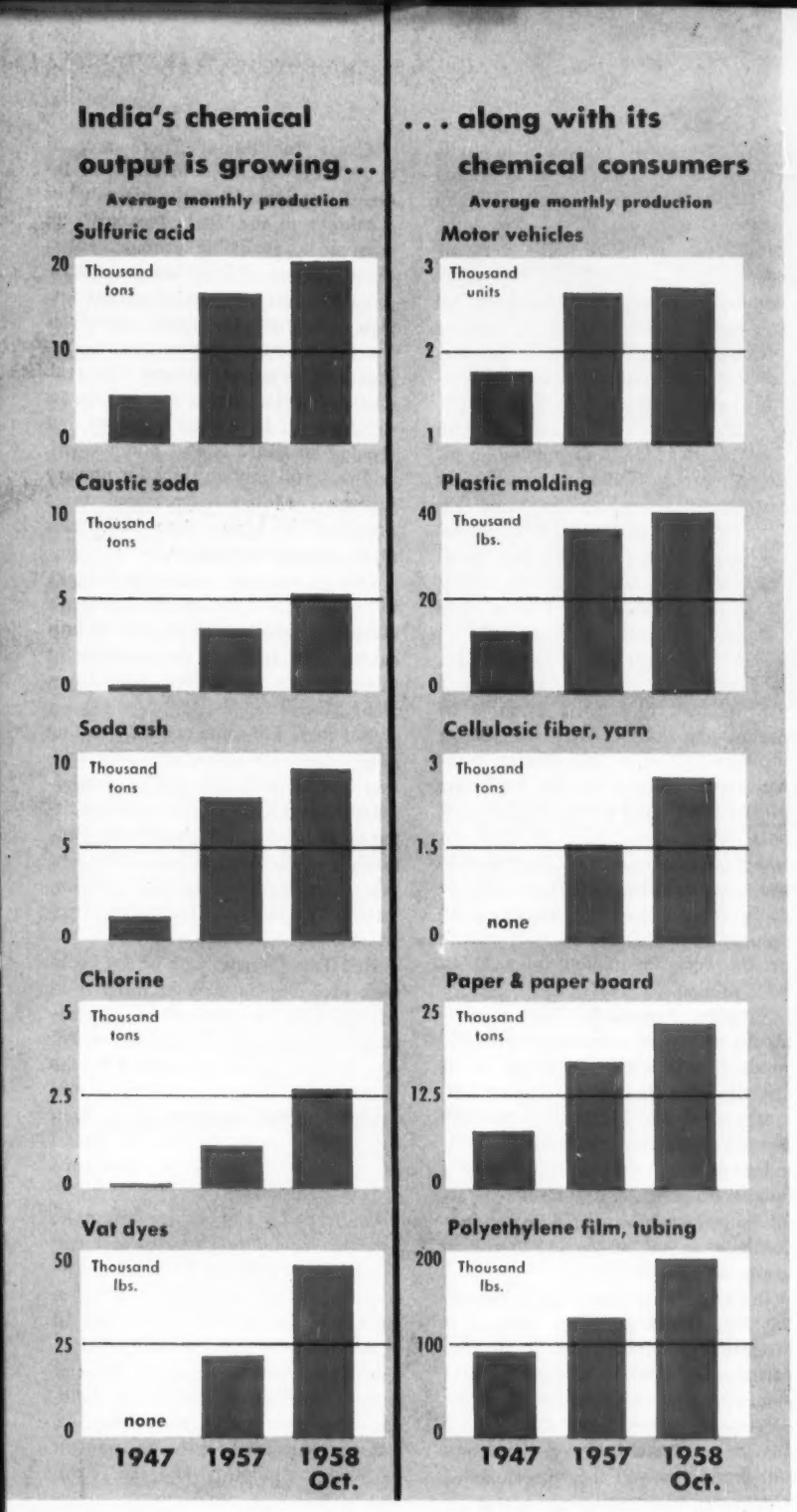
	1957	1958 (first 11 mo.)
Chemicals(1)	$61.2	$52.3
Pharmaceuticals	$34.4	$20.1
Explosives (including miscellaneous chemicals)	$22.6	$15.7
Fertilizers (manufactured)	$ 8.9	$14.8
Pigments, paints, varnishes	$ 3.7	$ 2.1
Dyeing, tanning materials	$ 2.6	$ 1.8
Plastics	$10.7	$ 6.6

Selected chemical imports into India

Caustic soda	6,588.7 tons	6,171.8 tons
Soda ash	8,471.1 tons	4,829.8 tons
Acetic acid	5,135 lbs.	5,726.9 lbs.
Ethyl acetate	45,560 tons	205,466 tons
Phthalic anhydride	895,900 lbs.	1.1 million lbs.
Ethylene glycol	103,100 lbs.	183,000 lbs.
Salicylic acid	431,978 lbs.	725,092 lbs.
DDT	7.2 million lbs.	13.4 million lbs.
Rubber (crude, including synthetic and reclaimed)	$8.8 million	$8.5 million
Aureomycin	$725,747	$633,069
Chloromycetin	$838,928	$798,315
Penicillin (including preparations)	$3.7 million	$1.9 million
Streptomycin (including preparations)	$3.4 million	$1.9 million
Terramycin	$592,544	$494,111
Cellulose acetate	2.0 million lbs.	859,000 lbs.
Polyethylene (all forms)	3.7 million lbs.	3.0 million lbs.
Polystyrene molding powder	32.6 million lbs.	235,200 lbs.
Vinyl (all forms)	2.1 million lbs.	2.7 million lbs.
Ammonium sulfate	84,110 tons	136,989 tons
Urea	5,016 tons	17,197 tons

Source: Govt. of India
(1) Not included in other groupings

Buoyed by the success of the first plan, which boosted national income some 18%, the government planners laid out a still more ambitious—subsequently proved unrealistic—expansion program for the '56-'61 period. Aim: to double expenditures, boost national income 25%, create 10-12 million new jobs. To feed this spectacular growth, the planners figured on raising $13 billion from government and private sources, including $200 million from private foreign investors. Industrial outlays were to total $2.7 billion, including $1.3 billion by the government. This would increase the



government's share in industrial investment, but most of this increased activity would be in basic industries outside the chemical industry. Exceptions: a few fertilizer projects, and expansions of a DDT plant, Hindustan Antibiotics, and another drug factory.

Chemical Goals: With the projected industrial growth, chemical consumption was slated to swell by '61: chlorine, 47,150 tons; hydrochloric acid, 33,000 tons; aluminum sulfate and alums, 50,000 tons; calcium carbide, 24,000 tons; sodium bicarbonate, 8,000 tons; carbon black, 5,000 tons; sulfur, 206,000 tons. Caustic soda capacity would have to be expanded by 36,000 tons to meet requirements for 141,000 tons; and 230,000 tons of soda ash will be needed.

Even if the government fertilizer projects were to be completed, demand is expected to outstrip capacity. Nitrogenous fertilizers will be short by at least 80,000 tons (in fixed nitrogen); superphosphates, by 673,000 tons. And 30,000 tons of potash (K_2O) will be needed.

The Big Letdown: But the government then discovered that these goals called for "an effort greater and more arduous than had been previously estimated." Investments needed to reach the goals had been underestimated by as much as 50%, with project costs pushed up by inflation.

By May '58, the government had grimly issued its revised plan, trimmed to essential projects.

In the chemical and allied industries, most of the planned projects have already been or will be completed. But the government's synthetic rubber, tungsten carbide, and aluminum plants have been deferred or "substantially slowed down." The Rourkela nitrogenous fertilizer plant, a raw film project, and a dyestuffs and intermediates plant won't be completed until the early years of the third plan.

Block for Private Industry: Private industry will bear the brunt of the cutbacks. Investments during the first two years of the plan held up well. But that picture has started changing. During the first half of '58, the government issued only 272 licenses for new industrial units, compared with 420 in the first half of '57. Reason: the government's tight grip on the release of foreign exchange, which has slowed to a trickle. As the government presses the economy for the funds needed for its own projects, cash for private investment is expected to grow tighter.

Eyes Abroad: Under these conditions, which are expected to prevail for a number of years, the prime hope for developing India's private industry—and approaching the second-plan goals—lies in attracting more foreign capital.

The wooing began in '57, when the Indian government signed an investment guaranty agreement with the U.S., insuring new or expanded U.S. investments of cash, commodities, pat-

ents or services against nonconvertibility. Last August, the government issued a major foreign investment policy statement, stressing that India would continue to permit extensive—often majority—foreign partnership, that it was eager for licensing agreements and would allow remittance of what it considers reasonable royalties and technical assistance fees. With U.S. officials, it is putting the finishing touches on an agreement to avoid double taxation of income, and has begun a far-reaching reappraisal of private investment opportunities.

Roots of the Past: Foreign capital was never really shunned. The British left behind a core of trained businessmen and administrators, and a Western concept of corporate law and justice. Soon after India won independence, in '49, Prime Minister Nehru laid down the basic policy of nondiscrimination against foreign investors, a policy that, U.S. experts say, has been faithfully honored.

Many prospective investors—especially American—have probably been scared off by India's professed philosophy of "socialism."

The government's policy is set forth in the Industrial Policy Resolution of 1956 and in a clarifying statement made in '48. The resolutions mark off industrial areas that will be controlled exclusively by the state (i.e., arms, atomic energy, mining, heavy equipment) and areas to be developed jointly by public and private enterprise (chemicals, fertilizers, synthetic rubber, aluminum, road and sea transport, etc.). All other industries are open to private enterprise, although the state can enter wherever it chooses. The boundaries are flexible, and the government has permitted limited private expansion even in the state's area.

The likelihood of nationalization is discounted by experts on India. Since independence, the government has nationalized only the airlines, the Imperial Bank, the life insurance business, and the Kolar gold mines. Moreover, the government lacks the funds for further seizures, since it practices a policy of fair compensation for property it seizes. Nor is it anxious to increase its already vast administrative burden. In any event, prospective investors can get a definite-period guarantee against expropriation of their property.

Bright Prospects: For several reasons, investment prospects in India are bright for U.S. companies willing to adapt themselves to the "Indian way." Despite the heavy tax load, profitability is often high—in some cases, higher than in the U.S. Over-all comparisons may be inaccurate because of differences in accounting procedures, but a survey by the Reserve Bank of India shows that chemical industry net profits were 4.1% of net assets in '56, compared with 3.5% in the U.S. And the Indian industry survey includes government fertilizer plants, which have reportedly been operating at little or no profit.

Companies starting up a new product line usually have a monopoly for at least several years. The government's tariff protection is liberal.

The history of Atul Products Ltd., in which American Cyanamid has a 5% interest, is a good example of government policy. After Atul began producing dyes in '52, foreign competition toughened. At the beginning of '54, the government slashed import duties from 38.2% to 10% on some intermediates used by the company, boosted the tariff from 12% to 20% and set import restrictions on competing imports. By '57, Atul's profits were $1 million on sales of $5.9 million.

Flexible Approach: The government's policy in promoting antibiotic production is another example of its friendly attitude toward foreign private capital and its flexible approach toward government industry.

Last October, Russia offered to help build a broad-scale, $60-million pharmaceutical complex, providing technical help and a 40-year, $20-million loan with 2% interest.

India did not snap it up (although the offer is still pending). Instead, it proposed to Merck that it go into partnership with an Indian government company to produce most of the proposed products, or that Merck provide the know-how for streptomycin production at the government's Hindustan Antibiotics plant. Merck decided against partnership with a government corporation, but it agreed to provide the technical help for Hindustan. Its commission was low—2½% tax-free on sales—but Merck won authorization to form an $8.4-million private corporation—holding 60% interest—with Tata Sons, to put up the largest ethical drug plant in India.

Cause for Pause: There are, of course, drawbacks to investing in India. Taxes have been the biggest; but starting with the '59 budget year, all companies, including foreign enterprises, will pay 45% on income, whereas 61.5% had been levied against foreign companies. This mainly simplifies the tax structure; the actual tax savings will be more apparent than real. The unpopular wealth tax and excess dividend tax have been removed, but the tax structure is still complicated, and may still contain traps for unwary investors. Moreover, personal taxes are 30-50% higher than U.S. rates at the management level.

One of the most serious drawbacks to foreign ventures is the government's attitude toward royalties and technical services. In these, the government gives few tax concessions, taxes them at 61.5%.

But there are some concessions that help balance the tax weight. Depreciation can be taken for 125% of original cost, and 85% of this can be written off in the first three years. Business losses can be carried over for eight years. And personal income taxes on salaries of foreign technicians are waived for up to two years.

Red Tape Tangle: One of the problems of doing business in India is in dealing with an army of bureaucrats and a tangle of official procedures. All new ventures must be licensed by the government. This may take years, and the prospective investor must often haggle over such details as capital valuation, tariff protection, assurance of raw materials.

Godfrey L. Cabot, for example, has been negotiating for the last two years on its proposal to build a carbon black plant, and still has not won assurance that it would be able to import its raw materials duty-free.

But once the big license barrier is passed, says M. G. Webster, a Johnson & Johnson International executive, a company can expect the government to "live scrupulously" by the terms, and to help with problems.

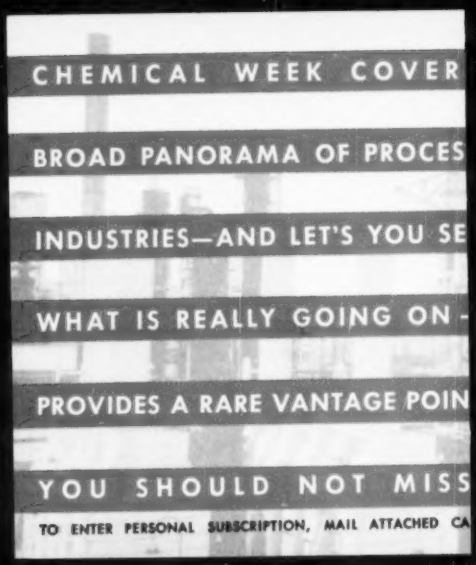
Two keys to successful negotiating, Webster says, are knowing exactly what the Indian government's policies are, then starting negotiations at the highest level possible.

For all the complications, the consensus of U.S. chemical companies operating in India is, "We're glad we're here."

CHEMICAL WEEK



KEEPS YOU ON TOP
OF THE CPI PICTURE


CHEMICAL WEEK COVER
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INDUSTRIES—AND LET'S YOU SE
WHAT IS REALLY GOING ON-
PROVIDES A RARE VANTAGE POIN
YOU SHOULD NOT MISS
TO ENTER PERSONAL SUBSCRIPTION, MAIL ATTACHED CA

U.S. Plant for Russia

While the U.S. chemical industry is still divided on selling equipment and know-how to Russia, and government policy remains unclear, Von Kohorn International (White Plains, N.Y.) has just wrapped up another major contract in Moscow.

Under the deal, which is worth more than $5 million—in cash—Von Kohorn will supply all the process equipment, engineering and production know-how for a 50-million-lbs./-year viscose staple fiber plant. It will be built about 200 miles south of Moscow, will include chemical recovery units, and will be designed for "substantial expansion."

Von Kohorn does not make its own equipment. For this new plant, and others it sells, it licenses U.S. and foreign producers to provide the equipment. Equipment for the Russian unit will come from the U.S., western Europe and Japan.

Not the First: This is the second contract Von Kohorn has signed with Russia during the past year. Last summer the company signed a $5-million contract for a plant to produce polyester fiber, yarn and cord. Von Kohorn first dealt with Russia some 30 years ago, when it built two rayon plants there.

"Our philosophy," President Henry Von Kohorn told *CW*'s Moscow correspondent, "is that the Russians have business to offer, and if we don't take it, west European producers will."

He points to all the Russian contracts signed with west European producers during the past 12 months, including plants for rayon tire cord coming from Italy, two synthetic fiber plants from West Germany, another synthetic fiber unit and one or two acetate plants from England.

"Naturally, when the Russians wanted to know what we had, we checked first with Washington," Von Kohorn told *CW*. Negotiations started informally in December, with Techmashimport, the Soviet import agency for synthetic fiber and film machinery, and "got down to brass tacks" in April.

Meanwhile, European process equipment makers continue to chalk up big Soviet orders. The latest: a $4.2-million contract for sugar beet processing equipment, signed with two British firms.



CW PHOTO—AL WAGG

Karl Ziegler: Does his simplified, low-power process point to a . . .

Fomenting TEL Revolution?

Karl Ziegler, master molecule-builder, gave chemical and petroleum men a new peek into his bag of tricks last Thursday: his revamped process for making tetraethyl lead.

The occasion was Ziegler's lecture at New York City's Carnegie Hall as a part of the Fifth World Petroleum Congress (*see p. 108*).

Actually, his disclosure came as no great surprise. It had been known that Ziegler's process had been modified. And it was expected that he might choose the congress as a means of making the revisions known (*CW, April 25, p. 52*). The expectation grew to almost a certainty when no preprints of his paper were available and when he hinted that he might have "something important" to discuss.

Trialkyls and Electrolysis: In his revised TEL process, the only materials consumed are ethylene, lead and hydrogen. The process starts with production of sodium hydride (from sodium and hydrogen). This reacts with an aluminum trialkyl (he won't identify the alkyl) and ethylene to form a complex—Na $[R_3AlC_2H_5]$. Next, this complex is fed to an electrolytic cell employing a lead anode. TEL forms at the anode. Other products are sodium and the aluminum trialkyl, which can be "easily separated" and recycled.

According to Ziegler, the process gives high yields: lead reacts quantitatively and other losses are small. The reaction takes place at 100 C, whereas in conventional TEL processing, the electrolysis is conducted at 600-700 C. Electrical requirements are about half (1,500 kwh./ton of TEL, compared with 3,000 kwh. for the conventional process).

What's the Difference? In his earlier route, Ziegler was actually electrolyzing aluminum triethyl (*CW, June 2, '56, p. 70*). This meant that solid aluminum was formed. Although it was a high-purity material (99.99%), the market for such a product is not very big. It was, moreover, difficult to remove.

In the new process, liquid sodium is formed instead. The difference between the two, says Ziegler, is the same as that between "handling coal and handling oil."

Adding It Up: There's no question but that, on paper at least, Ziegler has come up with a highly promising alternative to the current process for TEL. It would, Ziegler replied to a direct question, lend itself to production in small plants. Conventional production of TEL, of course, calls for big plants and a heavy investment.

Possibly significant is Ziegler's choice of the vehicle for announcing

the development. Since he chose the petroleum congress, he apparently expects petroleum companies to be interested in building small plants to meet their own TEL needs.

On the other hand, those with experience in the field point out that his trialkyl compounds are difficult to handle. TEL itself, of course, is nothing that a novice cares to make. Moreover, they point out, Ziegler's earlier process caused quite a furor but neither Du Pont nor Ethyl Corp., which certainly talked to Ziegler, have rushed to scrap their present plants.

Others Working, Too: In his lecture, Ziegler pointed out that the tetraethyl lead process employed today makes use of the reaction between a lead-sodium alloy and ethyl chloride, a reaction discovered in 1853.

Others too, are working on improvements of that process, as well as drastic modifications of it. Earlier in the week at the congress, Ethyl Corp's H. J. Gibson outlined some of the work his firm is doing along those lines.

Gibson's paper was concerned mainly with the firm's new manganese antiknock compound. But he also went into some of the progress being made in TEL process improvements.

In essence, he said that Ethyl was continuing to work on the reaction of triethyl aluminum with lead oxide to make TEL (*CW Technology Newsletter, April 13, '57*). He also reported that several processes involving the reaction of complex metal alkyls with metallic lead or lead salts are being investigated.

One new process employs the same raw materials as the current process, but halves sodium and chlorine requirements. This particular method, he said, permits the direct ethylation of metallic lead. This means that little if any lead must be recycled. (In the present process, each pound of TEL requires the use of 4 lbs. of lead; the other 3 lbs. must be recovered and recycled.)

Still, Ziegler's modification of his process, his stating that the process has "been piloted," and his worldwide renown combine to make consideration of his method compulsory when plotting the future for both TEL and the sodium that's consumed in making it by the present method.

New Polypropylene Lineup

Producer	Location	Status	Capacity
Hercules Powder	Parlin, N. J.	Onstream Dec. '57.	Now 20 million lbs./year; to be expanded to 50.
AviSun	Port Reading, N.J.	Startup slated for July '59.	Initially, 20 million lbs./year.
Humble Oil	Baytown, Tex.	Completion due early '60.	40 million lbs./year.
Texas Eastman	Longview, Tex.*	Pilot plant; commercial output later.	Not revealed.
Montecatini	Neal, W. Va.	Construction to start second half '59.	Initially, 11 million lbs./year.

* Probable location.

Add One in Polypropylene

The polypropylene roster is fast lengthening.

Montecatini's long-awaited move to the U.S. is about to materialize; the company plans to sell $10 million in debentures and stock warrants to U.S. investors this month to finance a new polypropylene resin plant near Charleston, W. Va. Moreover, AviSun, corporate offspring of American Viscose and Sun Oil, will start producing the resin next month, and will bring in a new, 10-million-lbs./-year film unit before the end of '59.

Exact location of the Montecatini plant is likely to be Neal, W. Va., where the firm bought a 260-acre industrial site two years ago (*CW Business Newsletter, July 6, '57*). It's believed the Ashland Oil refinery at nearby Ashland, Ky., would supply refinery gases—though Ashland and Montecatini won't confirm it.

Scale-up Expected: Initially, the plant will have a capacity of 5,000 metric tons/year. This, say trade sources, is probably only a starter, with a quick scale-up possible as markets develop.

Montecatini engineers have completed design work on the plant. Construction is to get under way during the latter half of '59, with completion scheduled for mid-'61.

For Film and Fiber: AviSun will bring in a 10-million-lbs./year film unit in the Marcus Hook, Pa., area by late fall. It reports film markets seem to be the most promising of all polypropylene applications. In addition, AviSun will complete, also by late fall, a 500,000-lbs./year pilot plant to make polypropylene fiber. Its 20-million-lbs./year resin plant, at Port Reading, N.J., is ahead of schedule, will be ready this July (*CW, Aug. 30, '58, p. 17*).

Hercules Powder assures *CW* that its plans to boost the capacity of its Parlin, N.J., plant are still firm. Though it expects stiff competition, Hercules expects to have an edge because, the company says, its product quality has greatly improved since commercial output started in Dec. '57. Eastman, which is now piloting polypropylene in Longview, Tex., has said it will build a commercial-scale unit—but doesn't say when or where.

And Humble Oil spokesmen tell *CW* that the company's abuilding 40-million-lbs./year unit in Houston, Tex., is going up on schedule, should be ready by the first quarter of '60.



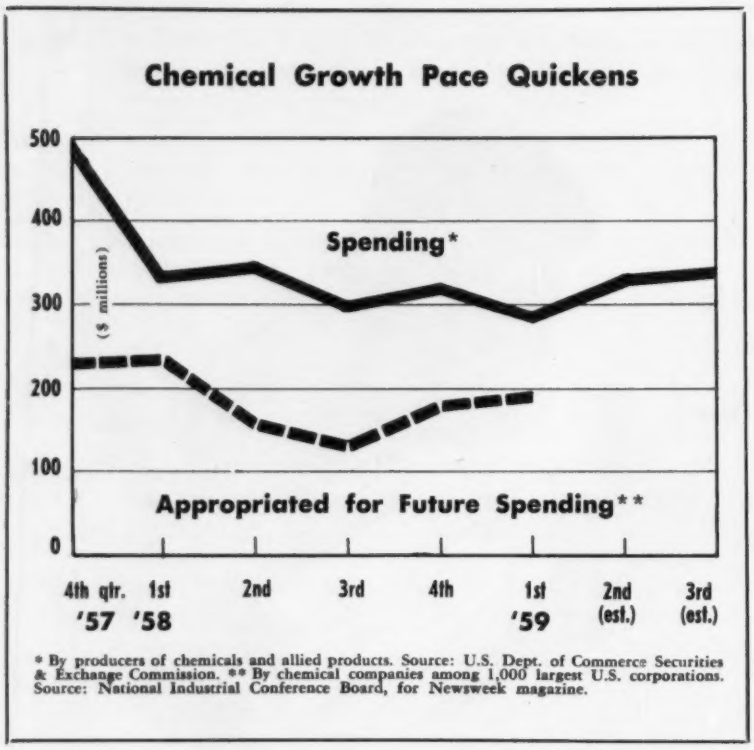
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* By producers of chemicals and allied products. Source: U.S. Dept. of Commerce Securities & Exchange Commission. ** By chemical companies among 1,000 largest U.S. corporations. Source: National Industrial Conference Board, for Newsweek magazine.

Slow Speedup on Spending

The postrecession pickup in CPI companies' capital spending is gaining momentum.

Evidence—coming late last week in a survey conducted quarterly by the National Industrial Conference Board for *Newsweek* magazine — strongly suggests that 1959 outlays for new plant and equipment will be notably larger than management anticipated just a couple of months ago (*CW, April 18, p. 38*).

Further substantiation is expected this week in the federal government's quarterly survey on capital spending by private business.

There's a major difference between these two surveys: The Commerce Dept. and the Securities & Exchange Commission obtain their data from reports mailed to Washington regularly by corporations and many nonregistered companies; this survey shows capital spending in past quarters and estimates on such spending in the present quarter and in the next following quarter.

NICB polls 500 large manufacturing corporations each quarter on money appropriated for future capital spending and backlogs of appropriated but unspent money, and extrapolates from these data to figures for the nation's 1,000 largest industrial concerns.

So the government survey is a measure of actual spending; NICB's poll gauges money earmarked for expansion and modernization in the future.

For all of the chemical process industries, the latest NICB survey indicates that boards of directors are planning to boost the rate of capital spending this year.

But the NICB study seems to show that chemical companies are being more cautious than other CPI concerns in stepping up their '59 spending plans.

NICB's figures on first-quarter appropriations by other CPI groups: paper products, $64 million, up 39%; petroleum and coal products, $964 million, up 2%; rubber products, $48 million, up 23%; nonferrous metals, $91 million, up 57%; and stone, clay and glass products, $85 million, up 93%.

Army Eyes AEC Plant

The Atomic Energy Commission's idle heavy-water plant at Dana, Ind., may be put to use by the Army's Chemical Corps for a "highly classified" project.

The $100-million plant was formerly operated for the AEC by Du Pont. It was put on stand-by status in 1957 as "excess to the foreseeable needs" of the AEC. The commission's remaining heavy-water plant, at Savannah River, S.C. (also run by Du Pont), is operating at only one-third capacity.

Army sources refuse to discuss what they plan to do with the plant. But it is definite that a Chemical Corps team has visited the Dana plant, as well as other sites, and that the Army's Corps of Engineers is negotiating with the AEC for transfer of the facility to the Army.

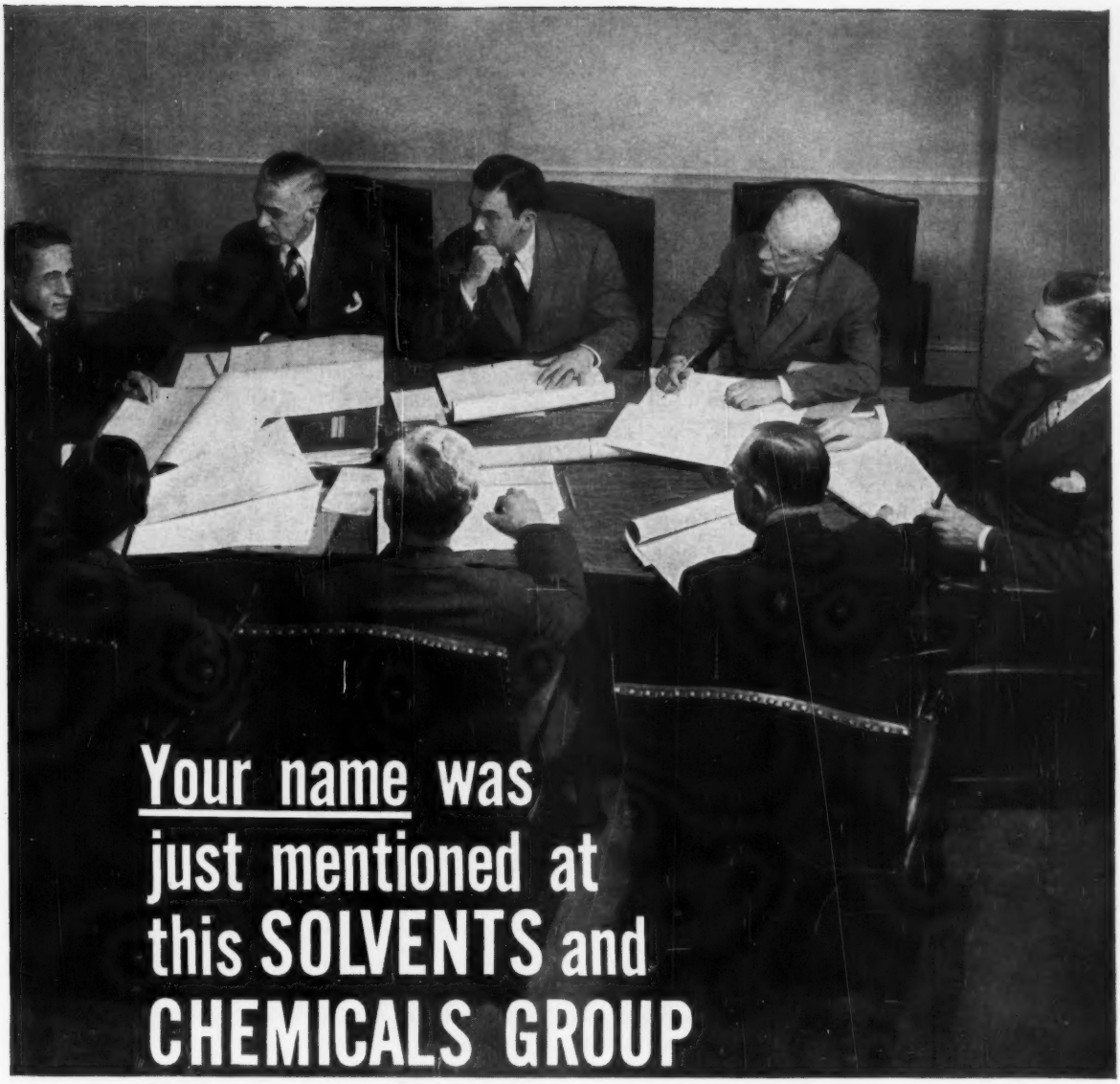
Meanwhile, Jerome Spevack, inventor of the heavy-water distillation process used at Dana, has won a new district court order restricting disclosure of his process during the Dana conversion. In April, the Supreme Court forbid AEC disclosure of his process. Under the new order, Dana contracts cannot reveal it, and the Army must tell Spevack which parts of his process are used at Dana.

Easing Up on Imports

Selling more to the U.S. than it's buying for the first time since 1865, the United Kingdom has lifted import quotas on a wide range of consumer goods.

Included in the easing: lubricating oils, paints, pigments, enamels, varnish, toilet preparations and perfumery, soaps, detergents, disinfectants, plastic goods, and rubber products, including tubes and tires. The move follows last summer's lifting of import controls on most chemicals from the dollar area.

Effect of the opened door on U.S. imports is impossible to estimate exactly, British Treasury spokesmen say. But they don't expect a significant addition to their total import bill. The major effect will be to allow U.S. chemical producers to compete with European suppliers for British business, as nearly all the items freed from control already could be imported freely from western Europe.



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COMPANIES

Union Oil has just approved a $1.5-million addition to its antipollution equipment at its Los Angeles refinery. To be added; carbon monoxide extractor; it's part of a $17-million improvement program. The new unit will bring Union's pollution-control outlay here to more than $10 million.

•

Texas Gas Corp. (Houston) has been purchased by a group headed by Carl M. Loeb, Rhoades & Co. (New York investment house), Godfrey L. Cabot, Inc., and Russell M. Riggins, Texas Gas president. Texas Gas operates a 225-million-cu. ft./day gas processing plant and a 10,000-bbls./day oil refinery. Purchasing price was not disclosed; TGC's assets have been listed at more than $30 million.

•

Calera Mining Co. is shutting down its open-pit cobalt mine and cobalt-copper concentrator at Cobalt, Ida., and its electrowinning refinery at Magna-Garfield, Utah. Reason: The Office of Civilian and Defense Mobilization did not extend its contracts with Calera.

•

Chas, Pfizer & Co.'s future headquarters building is now under construction on East 42nd St. and Second Ave., New York. The 32-story aluminum and glass structure is scheduled for completion in the spring of '61. Pfizer has taken a long-term lease on 300,000 sq.ft. on 18 floors.

EXPANSION

Manganese Dioxide: Bright Star Industries is doubling capacity of its Clifton, N.J., electrolytic manganese dioxide plant. The expansion had been planned for '60, Bright Star says, but sales increases and the early completion of three new production lines for new types of high-voltage batteries prompted the step-up.

•

Paper: Rome Kraft Co. has awarded Rust Engineering Co. a $28-million contract to expand Rome Kraft's operations at Rome, Ga. Capacity will be 500 tons/day, for container board, corrugated boxes, corrugated medium and liner board.

•

Aluminum: Kaiser Aluminum & Chemical Corp. has reactivated a potline at its Mead, Wash., reduction plant. This pushes Kaiser's operating rate up to a record 524,500 tons/year, 86% of its total 609,500-ton capacity. At its Ravenswood, W. Va., plant, Kaiser recently opened its third and fourth potlines. It started up its new 430,000-ton alumina unit at Gramercy, La.

•

Rubber Products: Goodyear Tire & Rubber Co. of Canada and Firestone Tire & Rubber Co. of Canada are both planning new multimillion-dollar fabricating plants for western Canada. Goodyear's plant, to cost an estimated $6-7 million, is to first produce a full line of tires; it can be expanded to make conveyor belts, foam rubber, hose and other items that it now makes in its Eastern plants. Firestone, as part of its U.S. parent's $55-million worldwide expansion program, has already taken an option on a 50-acre site in Calgary to put up a $7.5-million plant.

•

Vinyl: General Tire & Rubber plans a $1-million expansion for its Textileather Division, including a new building and a high-speed calender to produce unsupported vinyl sheetings, laminated vinyl materials, and semirigid and rigid plastics.

FOREIGN

Bacteriostatic Agents/Europe: Permachem Corp. and L. E. Waterman Pen Co. Ltd. (Montreal) have formed a new subsidiary, Permachem International. The new company will acquire the rights to all patents, formulas, trademarks and product developments in Permachem's line of fungus growth-inhibitors (applied to fibers) for distribution and marketing in Europe. Permachem will set up 50%-owned subsidiaries with local companies in England, France, West Germany and Italy.

•

Chemical Products/India: Japanese industry is stepping up activities in India. Three streptomycin producers —Takeda Pharmaceutical, Meiji Confectionery, and Kyowa Fermentation—have won out in bidding for construction of a 20-tons/year plant for the Indian government. Pfizer was the runner-up. The three companies bid through Mitsui Bussan, the former "Zaibatsu" trading company, which recently merged with Dai-Ichi Bussan.

During the next few years, Japanese interests in India are expected to expand as a result of the visit to Japan this month by top Indian officials. They will probably seek technical collaboration on several projects, including a 30,000-tons/year rayon pulp plant and an $18-million raw film plant. The latter was almost tied up by East Germany's Agfa, but the firm was unable to guarantee equipment delivery by mid-'60.

•

Phosphate/Mexico: The Mexican government has taken control of phosphate deposits in Lower California. The government's Guanos y Fertilizantes plant has been using an increasing amount of phosphates, mostly imported. Now, observers believe, Mexico may be readying to use local raw material and cut down on imports.

•

Fertilizer/England: Shell Chemical Co. has put the first units of its $18.2-million, 75,000-tons/year ammonia plant onstream at Shell Haven. Other units will start up later this year.



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Washington
Newsletter

CHEMICAL WEEK
June 13, 1959

Chemical firms may soon try a nuclear process heat reactor. A bill that has already cleared for House and Senate floor action would authorize construction of an experimental low-temperature process heat reactor costing $4 million.

Although such reactors are widely considered promising for heat-consuming industries such as chemical and paper, uncertainty has discouraged industry from going ahead on its own. Thus, the Atomic Energy Commission's idea is to demonstrate the technology, performance and economics with a government-built plant operated in cooperation with an interested company or industry group.

Expressions of interest on the part of industry are expected to be invited, once Congress votes final approval and funds for the project. If an acceptable offer is received, AEC hopes to begin construction within the next year. Steam from the plant would be sold to the cooperating firm at the same cost as steam from conventional plants. Eventually, the plant would be sold to private industry or dismantled.

If industry proves lukewarm about the idea, the commission and the Interior Dept. may work out an arrangement to try out the reactor as a heat source in a saline water conversion demonstration plant.

•

A test case on pharmaceutical advertisements circulated to doctors is in the works. It involves charges filed by the Federal Trade Commission against Chas. Pfizer & Co., Inc., for using doctors' names and reproductions of prescriptions in advertisements mailed to doctors on Pfizer's antibiotic Sigmamycin (*CW, June 6, p. 99*).

FTC says the names are fictitious and are not doctors who have prescribed Sigmamycin, as Pfizer's ad implies. According to FTC, this "deception" has unfairly diverted trade from competing antibiotic manufacturers.

The case marks the first attack of its kind by FTC. If the case goes through the courts, it could establish a precedent and lead to closer policing of drug ads aimed at doctors.

FTC is using the broad language against false advertising in Section 5 of the FTC act in the Pfizer case—the same law used in policing ads for tires, underwear, appliances and other products sold direct to consumers.

The legal question is whether, instead, it is limited to using less sweeping provisions of the same law, which specifically deal with drug ads circulated to the medical profession.

One of these other sections provides that no drug ad circulated only to the medical profession shall be considered false, unless it "contains a false representation of material fact." And this language has been in-

terpreted to mean a false representation of the therapeutic value or physical properties of a drug.

FTC believes it is not confined to using this section in dealing with ads distributed to the medical profession, but can use the broader language in Section 5 to deal with other misrepresentations like those alleged against Pfizer.

•

An important industrial-waste case will be decided by the U.S. Supreme Court. The court has agreed to rule on the dispute between the government and three steel companies over deposit of suspended solids into the Calumet River near Chicago.

The government wants to require the companies to obtain a permit, to deposit the waste, from the Army Corps of Engineers under the Rivers and Harbors Act. It also seeks to compel the companies to pay for dredging a channel in the river, which it says is gradually being clogged by the steel company wastes. Lower courts have ruled against the government on all points.

The three companies involved—Republic Steel Co., International Harvester Co. and Interlake Iron Corp.—say wastes from other industrial plants in the area are more significant factors in clogging the river channel.

•

Rules for enforcing the textile fiber products identification act throw cold water on plans by rayon manufacturers to cash in on the "wash and wear" sales boom.

The Federal Trade Commission's rules stick to defining generic names that must be used under the new labeling law by chemistry—rather than by what the fibers will do.

Thus, a request by Courtaulds, Inc., a subsidiary of the English firm, for a new generic name for its two new rayon fibers was denied. The fibers, intended for the "wash and wear" market, are unlike ordinary rayon in drying and shrink-resisting qualities. But FTC ruled that since the basic chemical material in them is cellulose they will have to be called "rayon."

In fact, FTC's definition of "rayon" appears to include nearly all manufactured fibers made of cellulose. So, the rule apparently will apply to similar new nonshrinking fibers being developed by American Viscose Corp.; American Enka Corp.; Burlington Industries, Inc., and others.

The new fiber producers are worried about consumer acceptance of "wash and wear" materials if they must be labeled "rayon."

The 45 final rules adopted by the commission pretty much follow those proposed and discussed at public hearings last March. The "rayon" dispute is the principal problem solved in the new rules. FTC's rules and the new law become effective next March 3.

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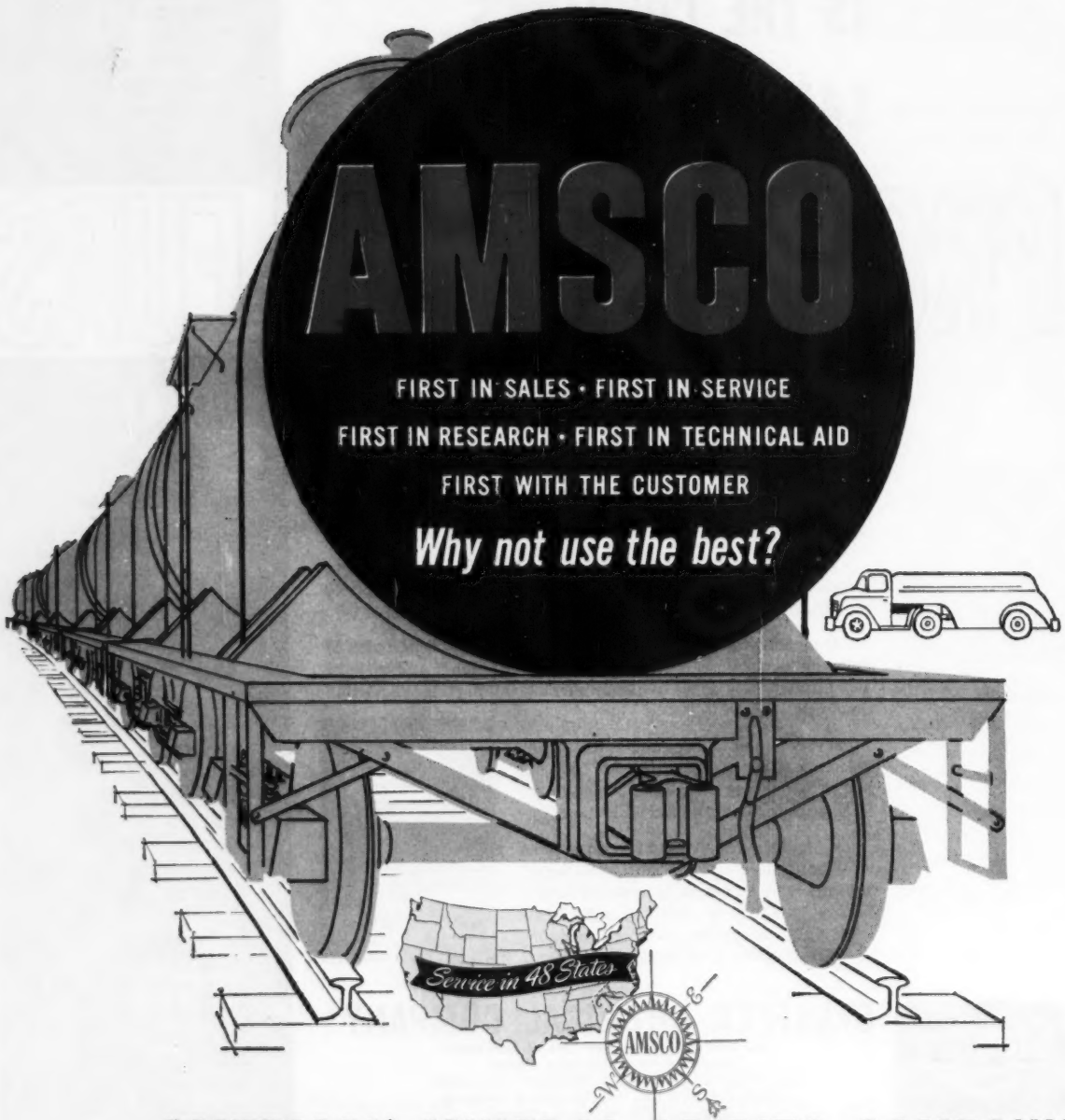
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This week, more than one plant problem will be solved and costs cut by the engineering specialist. And there is growing evidence that plant tours, like the one by Monsanto's Carl Martinson, pictured above, is one of the specialist's most useful tools.

Du Pont's engineering specialists, its Engineering Service Division consultants, refer to their plant tours as "$10,000 walks." They are disappointed if the value of their on-the-spot suggestions for solving problems and reducing costs doesn't at least approach that figure, according to Gerald Risser, assistant manager of the division. And the figures back them up: a two-for-one return for each $1 that's spent on their consultant services.

Standard Oil Co. of California's engineering department might now have been tallying the results of a questionnaire asking Socal's operating companies to evaluate a formal refinery-visiting program after the second round of tours by specialists — but the questionnaire was never sent out. Socal was already convinced that the program is worthwhile.

Socal, like some other process industry companies, sees the advantages of having engineers develop specialties (e.g., instruments, power-plant and electrical equipment, pumps, machinery, materials and others). It has had specialists for at least 20-25 years. But until recently, plant visits have been on an informal basis — usually when a major problem required one.

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of the few companies that follow a formal program. The engineers are able to chat with operating personnel, gain on-the-spot information that will help them to improve their selection of future plant equipment and to improve plant design and prevent repetition of previous design errors. Their first-hand looks help them decide whether less-expensive equipment and materials will do a satisfactory job. And, they are able to conduct training sessions and group discussions on latest plant practices, assist in solving current plant problems.

While the visiting program keeps the specialist informed, Joseph Hilton, Socal's pumps and machinery specialist, believes that the assistance the specialists give the operating people in many cases justifies the expense of the visit. Du Pont's Risser explains it this way: "It is very difficult to transfer experience from one plant to another. One plant may come up with a fine solution of a problem, but the concern of the operating people is— as it should be — their own plant. They haven't the time to pass the solution along to all the other plants. That's where the visiting consultants come in."

For example, Socal's instrument specialist, Roger Stanley, was able to pass along money-saving experience and recommendations for checking remote tank gauging systems from the El Paso to the Perth Amboy refinery.

Hilton concedes that it's hard to put the value of Socal's visiting program into actual dollars, but he says, "We believe the cost of the program is amply justified by savings to the company." An indication of the program's cost: four specialists made the rounds during formal visits, at a total cost of $12,000; the men visited 18 locations, spent 68 days at plants (giving an average cost of about $175/day).

This travel schedule would be considered light by many Du Pont consultants, some of whom travel as much as 50-60% of the time. But Du Pont has almost five times as many locations to cover as Socal. Socal figures to visit many of the locations every two years, feels there may not be sufficient changes to warrant a visit if the interval is cut too short. Visits have averaged one or two days in length, but some operating people felt that the visits were not long enough because actual equipment records couldn't be investigated.

A Matter of Size: The frequency and duration of visits in the future will depend on the number of problems at a particular plant. Some of the small plants may not be called on every two years. The big plants, of course, are always on the visiting list since they have a potentially greater number of problems.

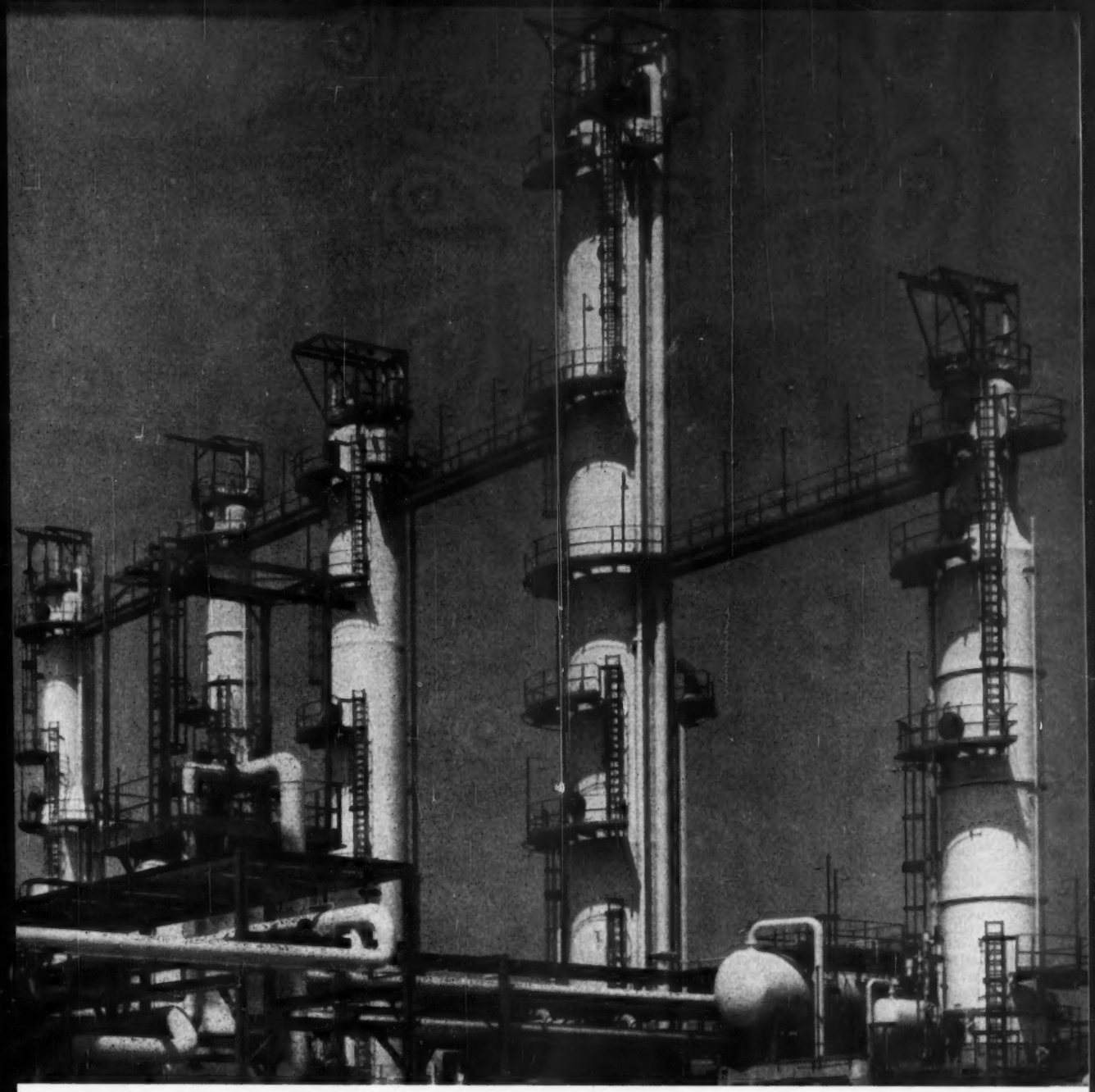
Union Carbide Chemicals has no central organization of specialists as do Socal and Du Pont. It has sufficient call at some individual plants to keep specialists on pumps, heat exchangers, etc., permanently stationed at the plant. Du Pont also has specialists stationed at plants as resident engineers. But they are "specialists" in general manufacturing problems, know when to call in consultants in the highly specialized fields.

Dow Chemical has a group of specialists who tour the plant circuit, and also a group of multiprocess specialists permanently stationed at its Western Division plant at Pittsburg, Calif. (*CW, Feb. 1, '58, p. 36*).

Stauffer Chemical relies on a few product specialists rather than equipment specialists. It has them for products such as carbon bisulfide, chlorine and caustic, metallic chlorides. American Smelting and Refining has both product and plant specialists: those specializing in product and process are located with central research in Plainfield, N.J.; power, materials and materials handling, dust recovery and ventilation specialists are located in Salt Lake City.

But other companies — W. R. Grace is an example — accent generalization rather than specialization. These firms point out that they can get specialized help when it is needed. For example, if they are having difficulties with a certain type of pump, they'll call in the supplier. And, they contend, the supplier not only has pump specialists, but also has specialists in the particular type of pump that is causing the trouble.

Million-Dollar Question: Some companies claim they can't afford to have specialists, are often willing to concede only when it comes to instrumentation. Du Pont's Risser agrees that you can't compromise. "A specialist must be competent, and this means 10-15 years of experience. You



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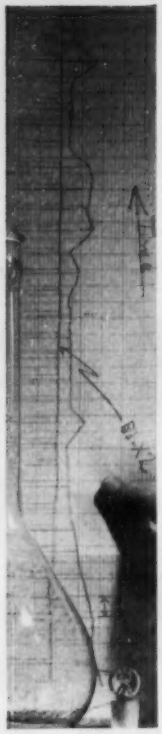
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The five large columns above and two separator units were shop-fabricated at Graver's East Chicago plant and erected by Procon Incorporated, the general contractor. Eighteen columns for the other two Platforming unit installations at Gulf's Philadelphia refinery were also shop-fabricated at Graver's East Chicago plant.

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can't hire a man right out of school and train him for a consulting job. Most of our consultants are at least 35-40 years old," he says.

This means high salary, top working facilities and liberal travel policies. No company is willing to commit itself on how it decides when it is willing to pay the specialist's price. But a rule of thumb seems to be a $1-million investment in an area that can be turned into a specialty.

Monsanto, however, points out that the most important point in the decision-making is whether or not a specialist can be kept busy. Du Pont's Risser adds that dispersion of the problems is often a determining factor in keeping a specialist busy. For example, at one time a materials-of-construction consultant couldn't have been kept busy at one Du Pont plant. But the combined problems of all the Du Pont plants justified such a man.

At one time, Du Pont's power-plant consultants were also part-time cooling tower consultants. Now, cooling problems have justified full-time consultants. Monsanto's Martinson, who had specialized in protective coatings at one plant, was made a company-wide consultant at the request of Frank L. Whitney, Jr., manager of the Research and Engineering Division's corrosion section (*CW, July 13, '57 p. 60*). Whitney's justification: potential contribution to Monsanto's cost-reduction program.

Some companies — such as Dow, Du Pont and Monsanto — enlist the aid of outside consultants even when they have their own consulting staffs. For example, Monsanto retained Kenneth Tator Associates to help Martinson establish his protective coatings program. Du Pont has called in the Academy of Natural Sciences to make stream surveys because there is not sufficient justification for a full-time consultant in this highly specialized field.

Promptness Pays: But in many cases, the promptness with which a full-time consultant can suggest solutions of problems pays many times over for his services. Eric Warner, Socal's engineering department head, makes the point that specialists' advice should be easily and quickly available if it is to be of real value. He says, "Anyone having a question or problem is welcome to telephone directly to the appropriate specialist engineer in the company's home office. A good many of the problems can be handled with a single phone call, or perhaps two calls, supplemented with an hour or two of work. Complex problems that can't be covered by phone are, of course, handled in writing."

But it's the formal visiting program that ferrets out plant problems that might otherwise go unnoticed.

Equipment Financing

Chemical equipment makers and the smaller chemical companies can look to a new source of financing sales and purchases of income-producing equipment. Standard Financial Corp. (New York) is offering a new financing plan tailored to fit the chemical industry.

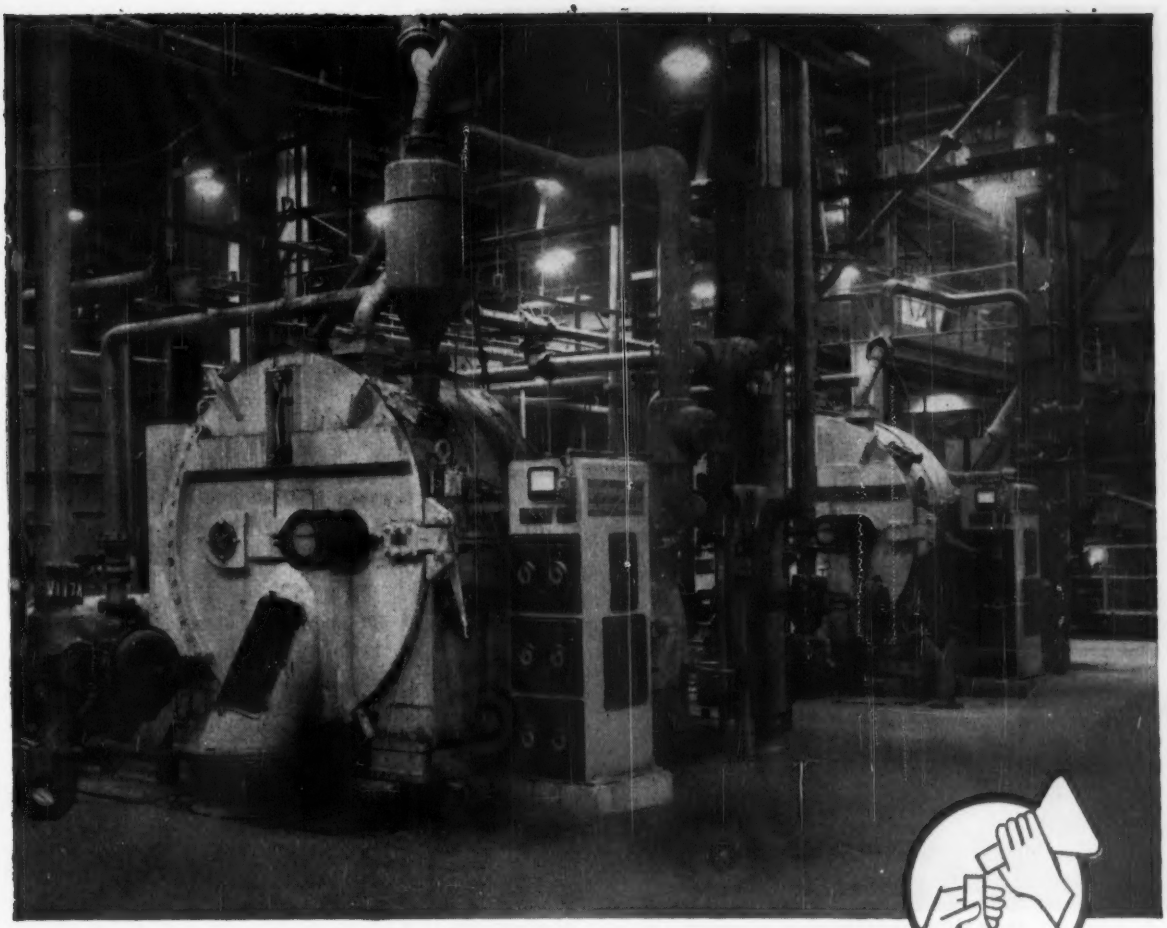
According to Arthur F. Silbert, SFC vice-president, the new program should be particularly attractive to companies in areas away from the major money markets. He points out that in some parts of the Southeast and Southwest, companies have difficulty in obtaining sufficient local financing. SFC's program doesn't compete with bank financing, instead is a supplement to it. Also, SFC's plan is suited to areas where bank lending policies favor other types of industries.

Under the program, equipment manufacturers can set up full programs for installment sales, obtain complete financing and have the financing company take care of all the customer credit and collection. Customer credits are checked within three days.

Equipment purchasers are required to make a 15% down payment in cash or trade, the balance payable in one to five years. SFC will advance 90-100% of the gross amount of the installment note, minus SFC's charges, to the equipment manufacturer.

EQUIPMENT

Modular Graphite Heat Exchanger: The Falls Industries, Inc. (600 Aurora Road, Solon, O.) is now offering its impervious graphite heat exchanger in a modular system to gain capacity flexibility and adapt the exchanger to countercurrent flow. The exchanger's basic units each have two connected concentric pipe sections mounted in



B-P CENTRIFUGALS used by UNION CARBIDE METALS COMPANY in Titanium Production

Although a metal, titanium is produced by a chemical process. Metal in the form of ore is converted to titanium tetrachloride, which is purified and then reduced to metallic sponge by sodium. In order to separate the brine from the titanium sponge, Union Carbide Metals Company, Division of Union Carbide Corporation, New York, utilizes Baker Perkins 66″ diameter type HS Universal Centrifugals. It's a tough application, but the B-P Type HS has proven itself efficient and dependable. These same machines are adaptable to a wide range of filterable fine solid-liquid slurries. Baker Perkins also manufactures type S Continuous Centrifugals which are used extensively for the separation of filterable coarse solid-liquid slurries.

Since centrifugation is such an important process in the chemical industry, and, since there are so many types of slurries that must be separated, Baker Perkins engineers give special design consideration to each specific problem. No matter what factors are involved in each application, our engineers can make recommendations on the proper centrifugal machinery.

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PRODUCTION

heavy steel stacking plates. All flange openings are placed at one end; the entire graphite section can be removed from the opposite end. The units are self-supporting, are available in 2⅛- and 2¾-in. OD pipe sizes and 6-, 9- and 12-ft. lengths.

•

Traced Aluminum Piping: Aluminum Co. of America (Pittsburgh 19) has added three new components and increased the maximum diameter of its Unitrace integral-steam-traced piping. The new components: a flange for simple joining of sections; adapter flange for joining flange bolt-circles one size larger than the pipe size; and a 90-degree elbow. Maximum pipe diameter now is equivalent to regular 8-in.-diameter pipe.

•

Pure-Water Controller: A new indicator-controller for monitoring high-purity water is available from Industrial Instruments, Inc. (89 Commerce Road, Cedar Grove, N.J. Called Model RD-A146 SoluBridge, the unit is calibrated to 0.05-1.0 micromho/-cm. specific conductance at 25 C, has compensation for temperatures in the range of 5 to 35 C.

•

Vibration Analyzer: A new portable machinery balancer designed to offer simplicity of operation with high sensitivity is a product of Stewart-Warner Corp. (1826 Diversey Pkwy., Chicago 14). The unit is adjustable to any machine having less than 10-millionths of an inch vibration amplitude to one having ⅒- to ⅛-in. vibration amplitude. Unit comes with collapsible tripod.

•

Radioactive Sampler: Tracerlab's (1601 Trapelo Road, Waltham 54, Mass.) new Auto/Well sample changer permits automatic assaying of large numbers of radioactive samples in liquid solution. Sample transport mechanism withdraws a vial from a circular turntable, inserts it into the well of a shielded scintillation detector. After the sample has been counted in a preset time or to a preset count, it is removed from the well and replaced in the turntable storage rack. Up to 50 samples are accommodated.

•

Air-Cooled Compressors: Atlas Copco (Paramus, N.J., and San Carlos, Calif.) has two new semiportable air-cooled compressors, called the AT

CHEMICALS OUTLOOK

June, 1959

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

RIGID URETHANE FOAMS FROM WYANDOTTE POLYOLS

Rigid urethane foams of superior properties are being produced with polyethers from Wyandotte. These foams are readily prepared using a semi-prepolymer, and are generally foamed-in-place.

They have exceptional insulation properties (low "K" factor), a high percentage of closed cells, low water absorption, and good strength. Foams of a two-pound density are dimensionally stable from 0°F. to 160°F. at 100% relative humidity, and show no distortion when held at 250°F. under moderate load. Densities can be varied with ease over a wide range from one pound per cubic foot to much higher densities.

These properties suggest use in thermal insulation, especially refrigerators and insulated vehicles; in the manufacture of building panels; as a shock-absorbing packaging material; in marine use for buoyancy; and a host of other applications.

The outstanding Wyandotte polyether for these rigid foams is Pluracol* TP 440, a polyether triol of relatively low viscosity. Prepolymers prepared from this Pluracol are stable in storage and easy to handle due to low viscosities.

Wyandotte Quadrol* polyol serves as the cross-linking agent in the preparation of these rigid foams, as the sole catalyst, and as a solvent for the fluorocarbon blowing agent. Since Quadrol is such a good solvent for the fluorocarbon, it is a simple matter to prepare solutions that will yield foams covering a wide range of densities.

RESEARCH PAPER ON URETHANE COATINGS PRESENTED

A paper, "Polyether Polyols in Urethane Coatings," by Wyandotte Researchers A. Damusis, J. M. McClellan, and K. C. Frisch, was presented at the American Chemical Society meeting in Boston.

The paper described recent work on specially designed polyethers which, when reacted with organic isocyanates, form urethane coatings.

Technical information on the preparation of these coatings and samples of the polyethers are available now. For further information on materials for either urethane coatings or rigid foams, address your inquiry to Department CO.

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Att: Wm. J. Jamieson, Area Development Director, Dept. CW-3
67 Broad St., New York 4, N. Y. WHitehall 3-5600

PRODUCTION

Series. The AT-1 compressor delivers 311-374 cfm. of air; the AT-3, 533-635 cfm. (both at 100 psi.).

•

High-Vacuum Systems: Two Boston-area firms are now offering systems for attaining vacuums in the range of 10^{-9} mm. Hg. Kinney Mfg. Division of New York Air Brake Co. (Jamaica Plain, Mass.) has a full processing unit that includes a work chamber measuring 12 in. in diameter, 18 in. high. This chamber is enclosed by an outer chamber that is evacuated to about 10^{-5} mm.

NRC Equipment Corp. (Newton 61, Mass.) has developed a new pumping system, based on a titanium getter that lowers vacuums from 10^{-5} mm. to 10^{-9} mm. The new system — which can be applied to existing vacuum chambers — consists of a cartridge containing tungsten filaments surrounded with titanium wire. A 60-amp. current at 3 volts is used to vaporize a portion of the titanium, which coats the surrounding surfaces and adsorbs gas molecules. The pumping cartridge needs to be fired only periodically in order to maintain the high vacuum level. Cartridge cost is $135; filament life, about 500 firings of 1-minute duration at pressures under 1 micron.

•

Low-Pressure Heater: A new line of heating systems that uses atmospheric-pressure, high-temperature oil rather than high-pressure steam is now available from Allis-Chalmers Mfg. Co. (Milwaukee). The hot oil — at 350-650 F—is circulated to processing equipment by a low-pressure pumping system. Capacities of the line (eight units) range from 0.5-10 million Btu./hour, is said to reduce initial cost, compared with high-pressure systems, and to eliminate the need for auxiliary equipment, such as flash tanks, condensate return systems and air ejectors.

•

Digital Transducer: American Meter Co. (Garland, Tex.) is now offering a new line of mechanically amplified digital transducers. Called Series 400, the new transducers are available in pressures up to 10,000 psi., temperatures up to 600 F, and in mercury- or bellows-type manometers for liquid level or flow applications. Accuracy rating is ±1% of span.

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. . . WHERE THERE'S A GROWTH SITE FOR YOUR CHEMICAL PLANT

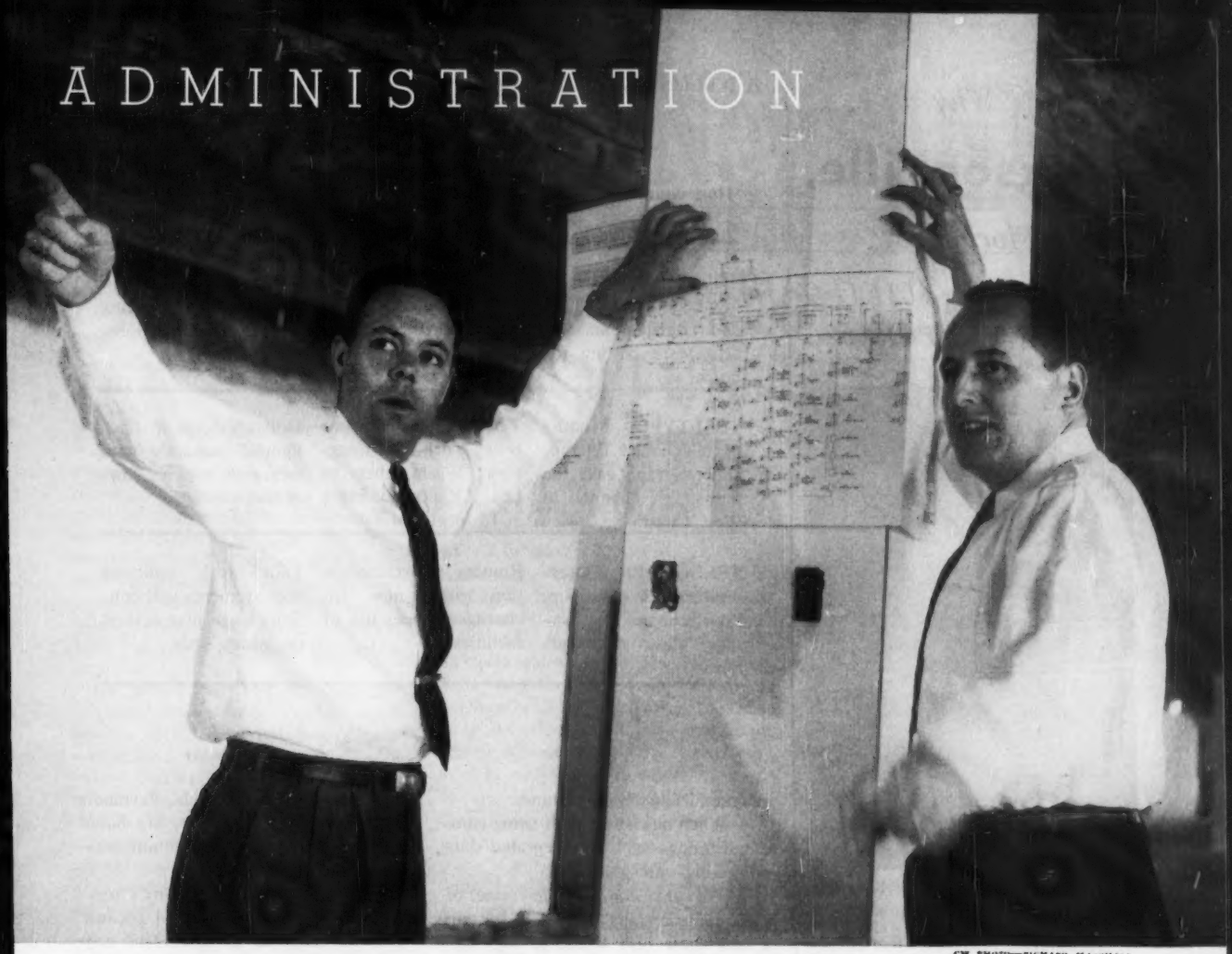
Fast as the chemical industry has grown nationally in the past two decades . . . up 528% . . . it has grown even faster in Virginia . . . up 650%. And behind that growth are facts that can favor *your* new plant as well.

A record of labor-management harmony *five times better* than the national average. Plentiful industrial water . . . with 92% of Virginia rivers rising within the state's jurisdiction.

Top grade coal nearby. Ample electric power everywhere, and natural gas on tap in most key areas. Many raw materials and basic chemicals at hand . . . with the rest available by low-cost ocean transportation through Hampton Roads.

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CW PHOTO—RICHARD MARSHALL

International's Hunt, Hogan Associates' Kitchen plan layout for new communications switching center.

Building for Smoother Communications

Reserved on the 13th floor of International Paper Co.'s freshly concreted offices in New York is space for a special tele-communication "switching center." It deals exclusively with International's private-wire message system, which has become a vital—and complex — part of its business. To help save costs, the company went outside for experts for help in setting up the center and the network it handles.

Called in were consultants William Hogan, William Kitchen and Thomas Tucker, who make up the staff of William F. Hogan Associates, Inc., which claims to be the only consulting firm in the U.S. that wholly specializes in helping corporations move messages over their own or public wires. As such specialists, this team has worked with more than 20 companies in the chemical field.

National Scope: It's the geographical factor, according to Hogan, that sets the process industries apart from many others in their needs for better communication facilities. The location of plants in distant areas brings with it a need for an over-all "design" to speed information from one key point to another.

To arrive at such a design, Hogan works with what seems like comparatively simple materials. His first step, after convincing a client of the need for his services, is to make a detailed analysis of the company's current telephone, Teletype and telegraph hookup—or lack of it—by a study of its vouchers for these services over a specific period of time. Hogan so determines where messages are going, where they originate, the frequency peaks and valleys, and the type and cost of the service carrying them.

Know the Need: His studies show that companies don't always realize their need for better communications organization. For guidance, Hogan cites several danger signs that can be a tip-off to problems:

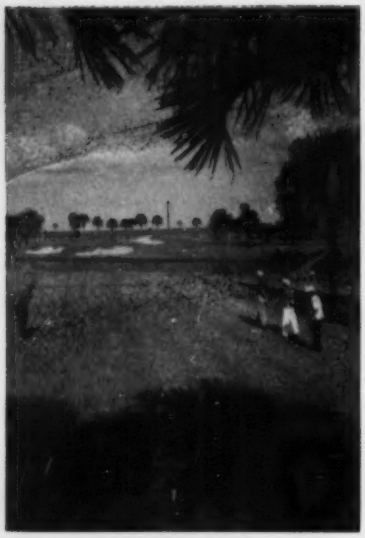
- When information needed on a scheduled basis is not arriving on time.
- When messages passing through filter points are being consistently slowed.
- When connections to other points are regularly difficult to get.
- When message costs at any one point run abnormally high or low.
- When rates charged for services are changed.
- When the "center of gravity" of the communications network shifts—

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COMMUNICATIONS CASE HISTORY

How counseling smoothed three message wrinkles at International Paper

PROBLEM	SOLUTION	RESULTS
TELEPHONE: Tolls between New York and Philadelphia offices were costing too much.	Line installed direct from New York switchboard to a Philadelphia exchange.	Over $4,000/year saved, direct dialing beyond Philadelphia permitted.
TELETYPE: Mixture of telephone, Teletype and telegraph gave too few simple channels to West Coast.	Teletype extended from New York to Longview, Wash., then to Los Angeles to bring in 15 locations.	Dollar savings in "five figures" annually with increased volume, lower unit costs.
TELEGRAPH: Overseas cables piled up. Poor choices of message class and carriers.	Routing and classification guide now encourages proper use of facilities.	Pilot work indicates improvements will continue when plan is used on wider scale.

geographically or by volume.

• When new systems of using communications—such as integrated data processing—are installed.

Where any company has one of these danger signs, Hogan is certain it can show him where savings can be made or service improved. At International Paper, for example, one six-month study resulted in at least six major service changes that included such things as installing leased telephone tie-lines to three major cities, installation of a trunk line between New York City and a Philadelphia telephone exchange, leasing of a telegraph circuit, and linking of 15 locations in 12 cities by private-wire telegraph. The study is still under way, is still giving monetary savings and improved service at International, according to Assistant to the Treasurer Joseph Hunt, who has been working with Hogan on the program.

Work Basis: All three Hogan staffers have backgrounds in such work, having worked for various telephone and telegraph companies. Within six months of receiving a company's communications vouchers and other data, Hogan submits recommendations—suitable to the client—that can produce measurable recurring savings exceeding the entire cost of his services. In fact, Hogan states, he'll take no pay if he can't do this. Payments for the service, of course, are based on a company's annual communications bill.

Hogan figures his company's service can be especially helpful because it is disinterested in equipment economics. Although many telephone and telegraph firms offer their own free consulting service, Hogan sells no equipment, makes recommendations solely on the basis of which is best suited for the job.

The consultants often find that companies already have someone keeping an eye on "communications," and such persons are first to be consulted by Hogan Associates. However, the consultants point out, often such a person either is so enmeshed in local problems that he does not have the detachment needed to sort out the over-all problems, or is not aware of the latest, most efficient, equipment. It's part of the consultant's program to train such people and help them to take over when Hogan's work is finished. The firm often favors having someone especially assigned to supervise the company-wide communications arrangements.

The period of a Hogan survey varies from one company to another, but the firm usually aims to be in and out in a year.

Lubrication News

PROFITABLE IDEAS ON THE LUBRICATION OF CHEMICAL PROCESS EQUIPMENT

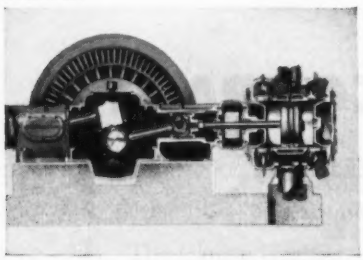
Carbon deposits in compressors are often a result of overlubrication

The plant engineer of a large basic chemicals plant recently handed us this problem: carbon deposits appeared regularly on the valves and cylinders of his air and gas compressors.

A Texaco Lubrication Engineer reviewed the possible causes. First, he checked the lubricants being used; the right lubricant had been specified for each compressor. Next, he examined the mechanical feed system that scheduled the rate of lubrication. Here, he found the feeders were set to admit too much lubricant into the compressors. This was obviously causing the carbon deposits.

He immediately recommended that trials be set up to determine the exact amount of lubricant required in each compressor. Intake valves, discharge valves and cylinder parts were frequently examined for presence of a thin oil film. Where dryness or light rusting appeared, lubricant feed was increased; excessive oil on the parts or in clearance spaces indicated the need for a reduced feed.

A Texaco Lubrication Engineer is always available for consultation on the choice and use of compressor lubricants.



Red arrows pointing to intake valves, discharge valves and cylinder ports show where to look for thin film of lubricant that indicates proper rate of feed. Deposits on valves are usually result of too much oil, poor grade of oil, or dirty intake air.

STORAGE METHODS CAN DETERMINE LUBRICANT EFFICIENCY ON THE JOB

Lubricant performance depends to a large extent on the way the product is stored and handled by the purchaser before it's used. Here are some proven methods that will insure complete protection for stored lubricants.

To avoid contamination with water
Best lubricant storage is in a fireproof building. If lubricants are stored outdoors, however, drums should be placed on their sides, to prevent rainwater from being sucked through the seal by temperature changes. This is particularly important with oils containing additives, since some additives are damaged by water contamination.

Outside storage in cold climate
Low temperature makes lubricants stiff and hard to handle. Heating will restore a workable viscosity, but if too much localized heat is applied to a lubricant it may be rendered useless.

The best way to handle very cold lubricants is to put them indoors and let them reach room temperature slowly. The safest fast heating method is to use exhaust steam. An exposed flame may melt the sealing compounds on the drum and cause leaks.

Safe ways to transfer lubricants
A standard pump that fits the drum opening will prevent contamination in transferring lubricants from one container to another. In some plants the product is applied directly from the original container to the lubricating point. It's essential in any case to avoid using the same pump and hose for different types of lubricants, to prevent contamination.



Ideally the oldest stocks should be used first. All Texaco products are factory-dated to facilitate this procedure. Basic safety demands that the floor of the lubricant dispensing area be kept clean to avoid falls and fires—and fire-fighting equipment should be nearby, just in case.

Guide to Organized Lubrication

This book discusses organized lubrication from management's point of view —as a means of controlling costs. It discusses methods that help raise production, extend parts life, cut downtime. For free copy, use coupon below.



TEXACO INC.
Dept. CW-CP-20
135 East 42nd Street
New York 17, N. Y.

I am attaching my company letterhead to this coupon.

☐ Send a copy of Management Practices that Control Costs via Organized Lubrication.

☐ Send information on Floatcoat.

☐ Ask a Texaco Lubrication Engineer to call at my plant.

Name_____

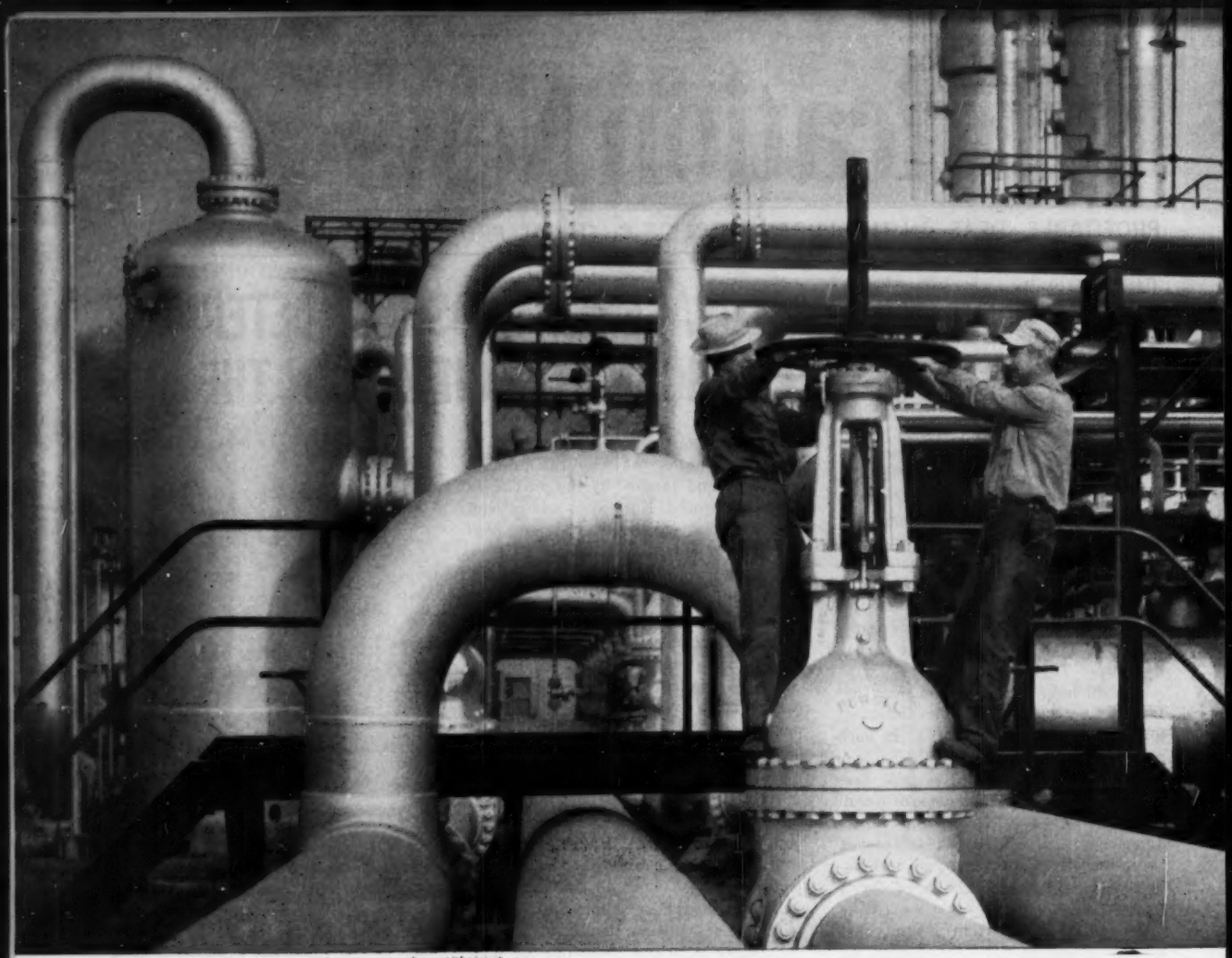
Title_____

Notice to plants with water-seal gasholders

Corrosive effects of water and weather on water-seal gasholders can now be reduced through development of a new use for a Texaco Marine Product. Furthermore, the simple method of applying the product (we call it Floatcoat) sharply reduces maintenance costs by eliminating the need for rigs, scaffolds, and complicated application equipment.

To apply, Floatcoat is merely poured on the water seal. As the tank rises and falls, the coat is spread on the side of the tank automatically. It provides a tough, adhesive shield against both the water in the seal and the weathering effect of the elements. In addition, it penetrates and cleans out existing rust. It is resistant to water washing, needs to be renewed only after long intervals.

Mail coupon at right for more information.

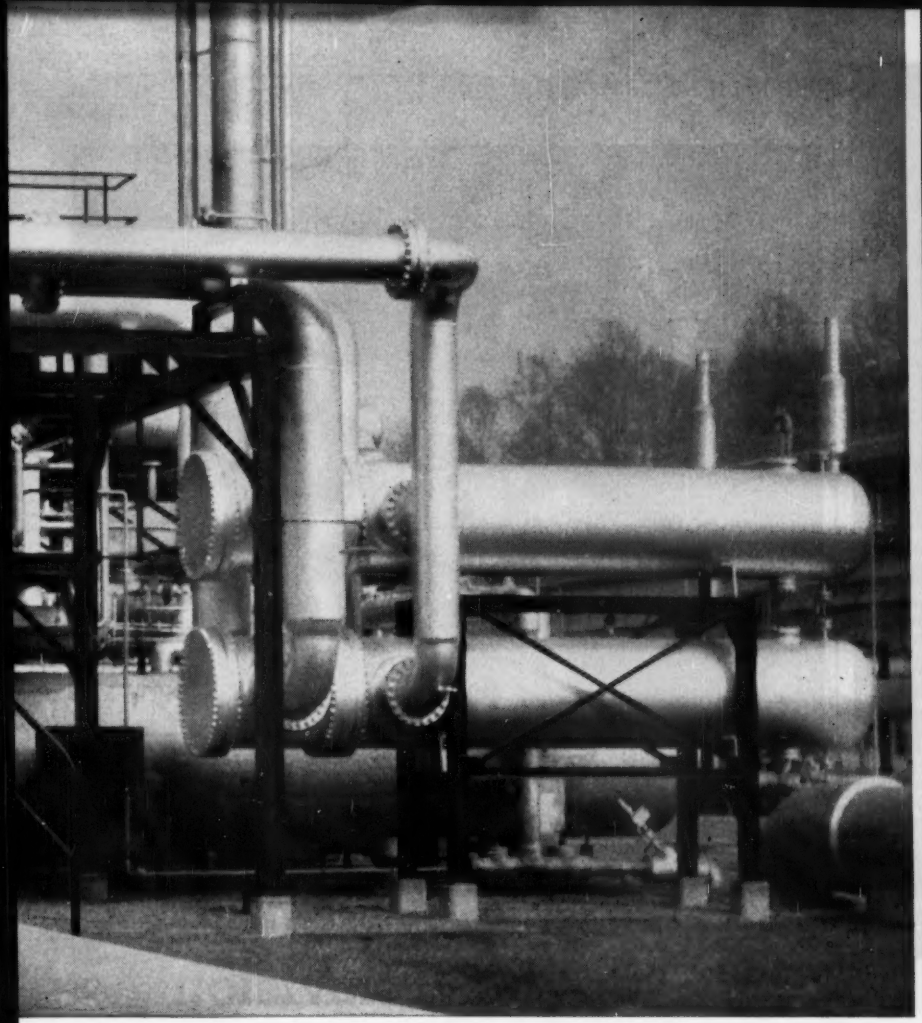


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Because of the dynamic growth of the demand for olefins, Union Carbide has established Union Carbide Olefins Company. It includes the staff and facilities and offers the same high attention to customer service that have been a Union Carbide tradition for 35 years.

The Olefins Company will continue concentrating on research—new, potentially profitable chemicals for your product development . . . on delivery—prompt, reliable bulk shipments from plants strategically located across the country . . . on volume production—assured supply with strict quality control . . . and on customer service—technically trained representatives devoting their time to your problems.

This strong emphasis on olefins will lead to even more useful products from ethylene, propylene, butadiene, and other petrochemical intermediates. Keep in touch with us for more information. Write Union Carbide Olefins Company, Room 630, 30 E. 42nd St., New York 17, N.Y.

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Ortho-Anisaldehyde

Sorry . . . but we can't presently give you much *use* information on O-Anisaldehyde. From what we've determined, however, this material (you may also know it as O-Methoxy Benzaldehyde) is expected to find uses as a pharmaceutical intermediate and in organic synthesis. We can supply you with our latest technical bulletins and samples. And we'd like to help you investigate any possibilities that the physical properties might suggest to you. Write us.

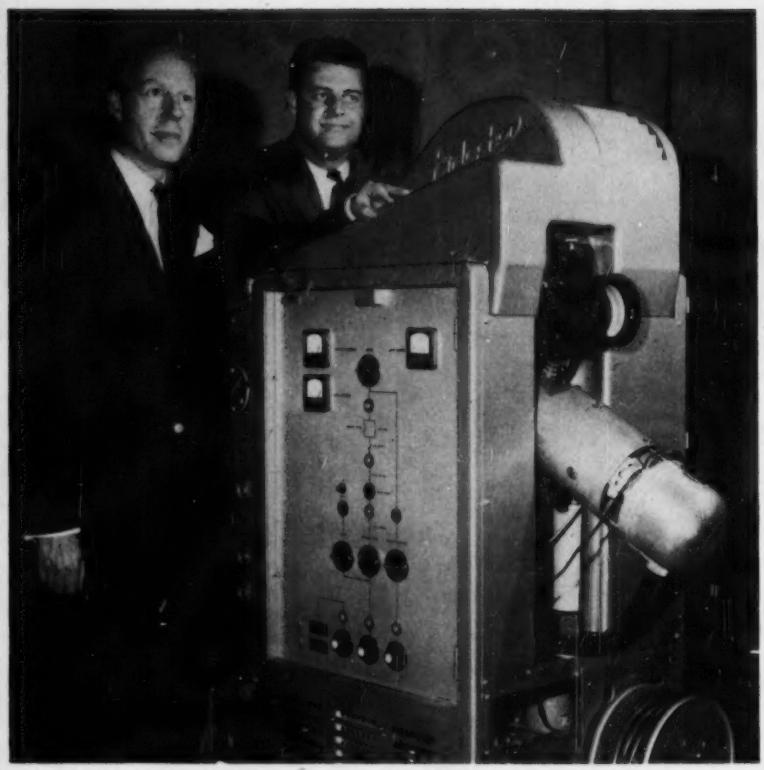
ANSUL

REFRIGERATION PRODUCTS
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Property Data*	
Molecular weight	136.14
Boiling point (at 760 mm. Hg.)	238°C.
Melting points**	(1) 38-39°C.
	(2) 3°C.
Specific gravity (liquid) 25°/25°	1.1274
Specific gravity (solid) 25°/25°	1.258
Refractive index n 20°D	1.5608
Odor—burned, slightly phenolic	
Solubility in H_2O—slightly soluble	
Minimum purity	95%
Appearance	white to light tan solid

*Determinations made on 99% pure material
**Exists in two crystalline forms

ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN



Eidophor's O'Connor (left) and Davis direct Ciba's new TV business.

Ciba Turns to Television

A new twist in diversification by a chemical process firm was Ciba's recent move into the closed-circuit television field. The move, according to Felton Davis, Jr. (above), vice-president and general manager of the new venture, is in keeping with Ciba's policy of diversifying into any worthwhile-looking areas.

Ciba's TV efforts will be handled by a new wholly owned subsidiary, Eidophor, Inc. The subsidiary, according to Davis, who formerly headed the medical TV unit of Ciba Pharmaceutical Products, will be independent of other operations of Ciba States, Ltd. (the U.S. holding company), and will be free to seek its own clients.

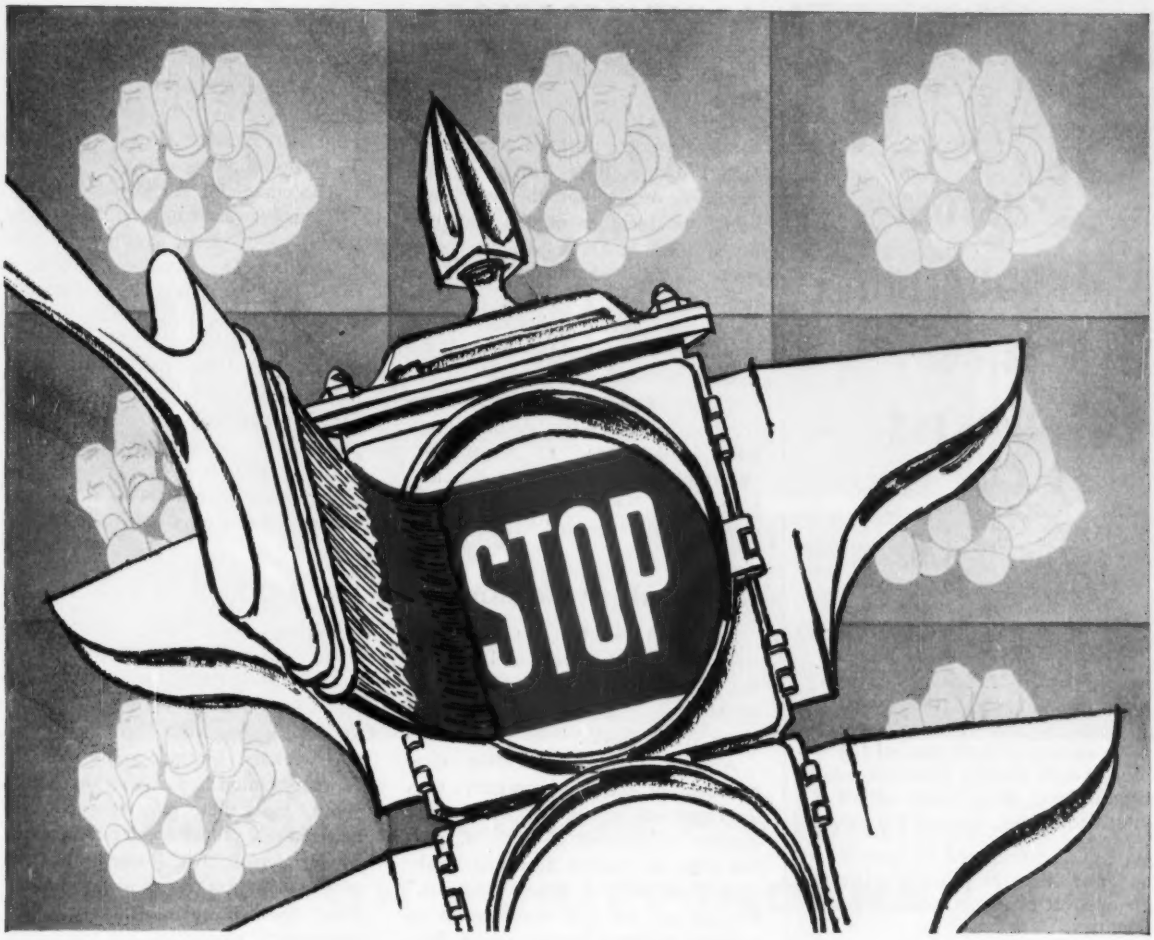
New Projection Principle: The subsidiary's name comes from the new Eidophor projector (*picture*), developed in Switzerland with the assistance of Ciba, and brought to this country last year by the drug, dye and plastics manufacturing concern (*CW, Jan. 10, p. 24*).

According to Roderic O'Connor (*above*), Eidophor president, the projector is based on a projection principle entirely different from available units. It is said to have an independent light source, be capable of projecting a 40 x 30-ft. black-and-white picture and a 20 x 15-ft. color picture.

The company currently has two Eidophor color projectors and the "world's largest" mobile unit for the production of color TV. Forty Eidophor black-and-white projectors and related equipment have been ordered. Total immediate investment, O'Connor said, will be "well over $1 million."

Concentrating on Business: O'Connor said the new firm will concentrate on closed-circuit televising of business meetings. This area, the firm's surveys show, is about the fastest growing part of the closed-circuit market.

The new subsidiary is working on closed-circuit shows with several industrial concerns, according to O'Connor, and has had discussions with the '60 Winter Olympics Committee on



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ADMINISTRATION

the possible use of the Eidophor at the games.

Davis told *CW* that while the new firm will work with Ciba Pharmaceutical Products, there will be no corporate tie-up between the two. However, one member of the Eidophor board is T. F. Davies Haines, president of Ciba Pharmaceutical Products, Inc.

Eidophor already has given several demonstrations of its projector, the most recent being before a Chicago meeting of the American Feed Manufacturers Assn. "When all our equipment is delivered," O'Connor said, "we will be able to link 42 cities across the nation in a black-and-white closed-circuit telecast."

New Italian Contact

Rumianca S.p.A., one of Italy's largest chemical concerns, is joining the U.S. chemical process scene by establishing Rumianca Chemical Corp. (New York).

Alfonsc Liguori, executive vice-president of the new company, says the move was necessitated by the "expansion of business in the U.S., plus ties that the parent firm had established with several American firms." Purpose of the new company is to promote business for the parent firm, provide information, act as liaison between Italian and U.S. interests of the parent firm, seek out and evaluate possible partnerships and licensing agreements.

U.S. Agreements: The 40-year-old parent firm recently negotiated licensing agreements or other arrangements with Stauffer, Amchem Products, Olin Mathieson and U.S. Rubber.

Last year, U.S. Rubber and Rumianca jointly formed Naugatuck-Rumianca. S.p.A. to manufacture and sell a complete range of chemicals for the Italian rubber industry.

Herbicide Liability

Product liability and a manufacturer's responsibility for his product after it is in the hands of a consumer is again in the news. A $188,011.02 damage suit has just been filed against Du Pont and three codefendants.

The suit, filed in Arizona superior court (Tucson) by a cotton-growing corporation, alleges that a weed killer, Karmex W., made by Du Pont, damaged cotton plants belonging to the growers' corporation, A.S.&R. Farms, Inc. Named as defendants with Du Pont were White Chemical Co., Earl T. Horton and his wife, Annie.

The complaint alleges that in July '57, the growers employed Horton to treat 716 acres of cotton with the weed killer. The preparation was sold to Horton by White Chemical, the complaint said.

The growers' corporation claims it lost the $4,291.02 it paid for the treatment, seeks an additional $183,720 for damages that resulted after the preparation was used.

Du Pont tells *CW* that it is still checking the circumstances in the case and that it has no comment now.

LABOR

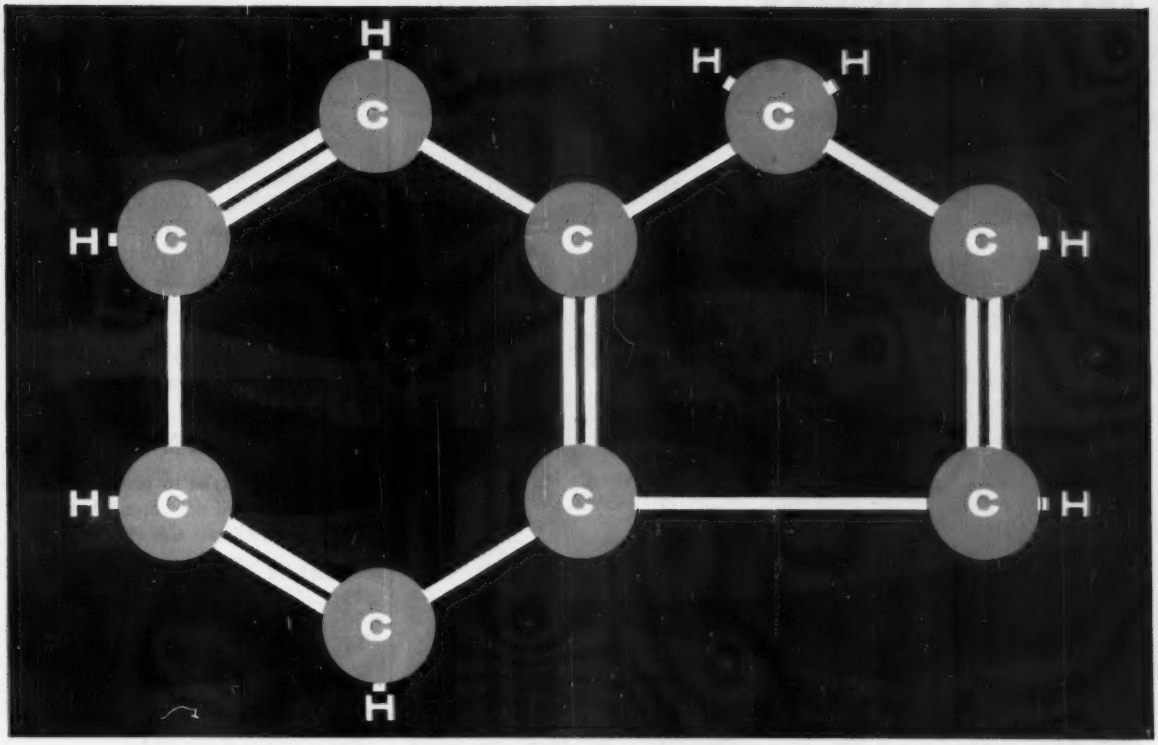
Carbon Case: In the midst of a strike that started April 30, Great Lakes Carbon Co. has opened an employment office at Morganton, N.C., to receive applications from prospective workers. International Chemical Workers Union is picketing the office. ICWU hints there may be a parallel between this situation and one in nearby Henderson, N.C., where the use of nonunion workers in a strikebound plant resulted in violence. Carbon supervisory employees are operating the plant. The strike reportedly is over increased quotas for the making of electrodes.

•

Western Pulp: The two big unions of the pulp and paper industry and the Pacific Coast Assn. of Pulp and Paper Manufacturers have agreed on terms for renewal of their uniform-labor contract. The one-year pact, effective June 1, '59, provides a 3% general wage increase for nearly 20,000 employees in 46 Northwest pulp and paper mills. Also provided: Dec. 24 as a seventh paid holiday and upward adjustments in other benefits.

•

Textile Contract: Industrial Rayon Corp. and the Textile Workers Union of America have settled on terms of a three-year contract covering 4,000 employees at Cleveland and Painesville, O., and at Covington, Va. The contract provides a 5% wage increase, retroactive to April 20, '59, a 2½% increase in June '60 and a similar one a year later, which, if the union desires, may be applied to a pension



Neville Announces Production of HIGH PURITY INDENE

Neville is now in semi-commercial production of high-purity indene. It is a mobile, almost water-white, high boiling liquid, similar in appearance to monomeric styrene. The big potential interest in this new chemical lies in the fact that it has two reactive centers—the double bond and the methylene group—both in the five-membered ring fused to the benzene nucleus. Indene will polymerize or react to form a wide range of useful intermediates. Potential uses are indicated in the fields of polyesters, synthetic rubbers, copolymers, insecticides and repellants, drugs, dyes, plasticizers, antioxidants, surface active agents and synthesis of steroids and vitamins. Use your letterhead or the coupon below to write for a bulletin and sample.

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Purity, % by Wt.	97.5
Freezing Point, °C.	−3.5
Specific Gravity 60/60°F.	1.0002
Refractive Index (n^{25}/D)	1.5726
Distillation Range (IBP-EP), °C.	180.0-186.0
Flash Point, °F.	173
Color (Saybolt)	+21 (inhibited)

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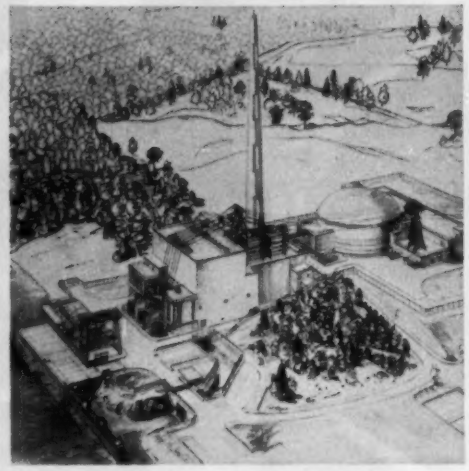
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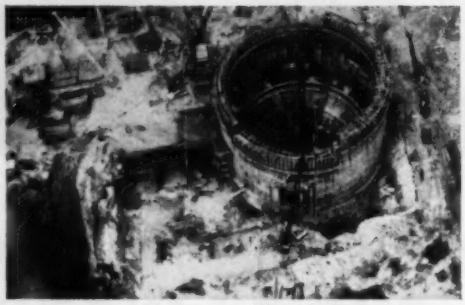
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Vitro Engineering Company, a division of Vitro Corporation of America, has served shoulder-to-shoulder with Con Edison and Babcock & Wilcox in developing this historic station. Its rôle began with the evaluation of reactor proposals, extended through preparation of all construction drawings and now includes assistance in the training of Con Edison's operating personnel for Indian Point.

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ADMINISTRATION

plan instead of wage rates. Vacations and insurance benefits were liberalized.

•

Cement Bond: Standard Lime & Cement Co. and Local 12965, District 50, United Mine Workers, at Woodville, O., have agreed on a three-year contract, effective June 1, calling for a 5¢/hour wage increase retroactive to March 1, a 5¢/hour hike beginning June 1, a 7¢ boost June '60 and still another 7¢ raise June '61.

KEY CHANGES

Joseph D. Ryan to general director of research and development, Libbey-Owens-Ford Glass Co. (Toledo).

Richard V. Hinman, August S. Hoyer to assistant vice-presidents, American Mineral Spirits Co. (Chicago).

Eugene H. Scott to secretary and treasurer, Pittsburgh Metallurgical Co. (Niagara Falls, N.Y.).

W. Frederick Luckenbach, Jr., to general manager, newly created Commercial Development Dept., Foote Mineral Co. (Philadelphia).

George T. Scharffenberger to vice-president, Litton Industries, Beverly Hills, Calif.).

C. C. Helmle to vice-president and general manager, Enthone, Inc. (New Haven, Conn.), subsidiary of American Smelting and Refining Co.

Samuel Cooke to director, Crown Cork & Seal Co. (Philadelphia).

Edward J. Matson to director of scientific administration, **LeRoy W. Clemence** to associate director, Abbott Laboratories (North Chicago).

KUDOS

To **Emery I. Valko,** professor, Division of Chemistry, Lowell Technological Institute, the '59 Olney Medal of the American Assn. of Textile Chemists and Colorists.

DIED

Wayne A. Brown, 63, assistant vice-president and manager Eastern Division (New York), Crown Zellerbach Corp., at White Sulphur Springs, W. Va.

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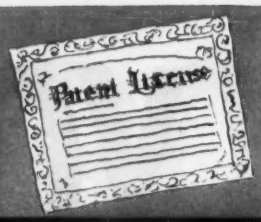
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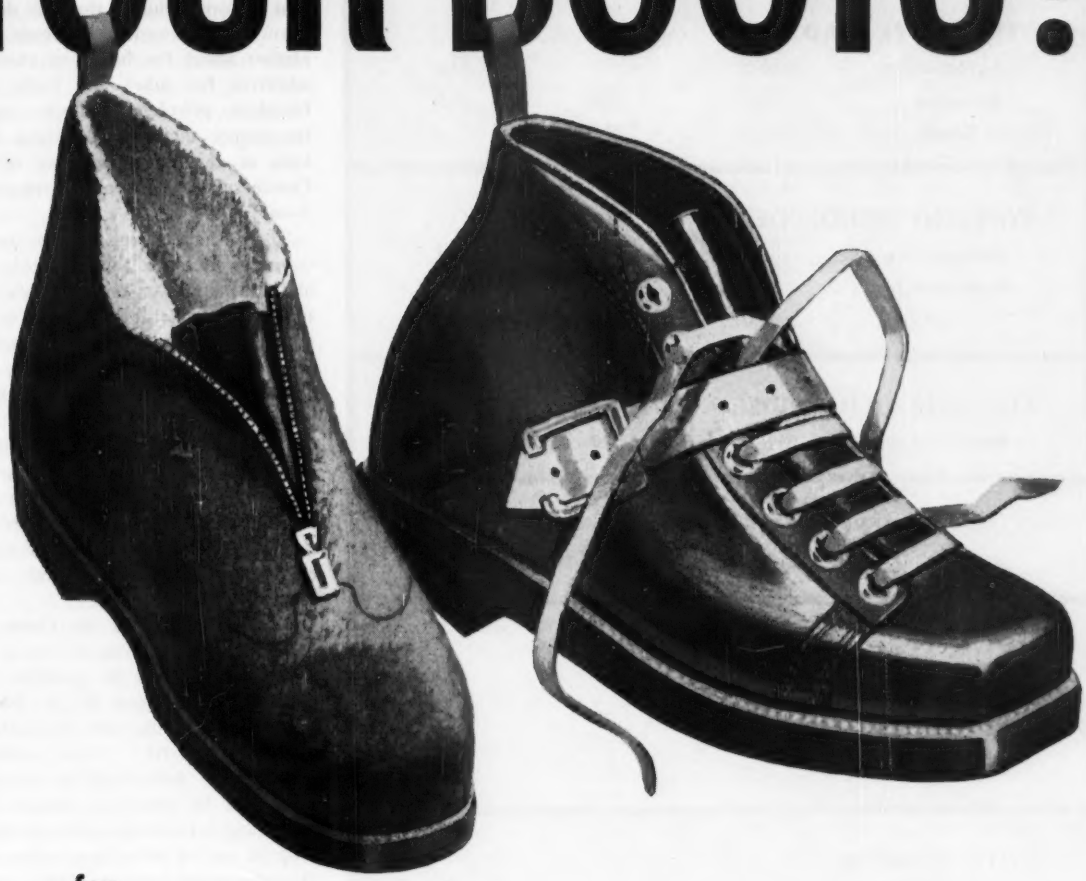
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Depth-Probing the Demand for

	1958	1960	1965
TETRAETHYL LEAD		(Million pounds)	
Automotive	455.2	485.0	533.2
Aviation	57.2	42.6	31.8
Total	512.4	527.6	565.0
ETHYLENE DIBROMIDE			
Automotive	132.7	141.4	155.4
Aviation	33.3	24.8	18.5
Total	166.0	166.2	173.9
ETHYLENE DICHLORIDE			
Automotive	139.4	148.5	163.3
COMBUSTION DEPOSIT MODIFIERS			
(as phosphorus)	2.07[a]	2.46[a]	2.71[b]
ANTIRUST AGENTS			
(active ingredients)			
Automotive	4.0	4.3	4.7
Aviation	0.57	0.42	0.32
Total	4.57	4.72	5.02
ANTIOXIDANTS			
(active ingredients)			
Automotive	6.66	7.09	7.80
Aviation	0.684	0.509	0.381
Total	7.344	7.599	8.181
METAL DEACTIVATORS			
(active ingredients)	1.3	1.4	1.6
DYES:			
Automotive	0.80	0.85	0.94
Aviation	0.065	0.048	0.036
Total	0.865	0.898	0.976

*CCDA report by W. A. Herbst, Esso Research & Engineering Co. [a]Assumes 30% of all gasoline contains phosphorus. [b]Assumes all premium gasoline contains phosphorus.

Rapid technological changes expected in the nation's automotive and aviation industries during the next decade have spurred considerable trade speculation about the future of chemical additives for lubes and fuels. Last fortnight, petroleum industry experts thoroughly depth-probed these markets, at the spring meeting of the Commercial Chemical Development Assn.*

There have been many recent warnings by trade observers that fuel and lube additives requirements may undergo considerable changes in the next decade. This pessimism has been balanced, however, by cheering observations that new fuels and lubes will probably require new additives. Market patterns — not sales volumes —will be affected most by the change. The CCDA reports clarify things considerably: the established petroleum products additives will, in most cases, enjoy growing markets at least through '65.

Gasoline Additives to Grow: A comprehensive analysis of future additives requirements in gasoline formulation came from W. A. Herbst of Esso Research and Engineering (*see chart, left*). These additive markets, he says, will be strongly influenced by changing demand for motor and aviation gasolines. A steady drop in use of aviation gasoline, for example, is attributed to displacement of aircraft piston engines by turbine engines (additive requirements of jet turbine fuels were covered by others at the meeting).

Most important additive in automotive gasolines is, of course, tetraethyl lead; in '58, it was used in 97.5% of all automotive gasoline sold (at an average concentration of 2.3 ml./gal.). Herbst figures about $277 million/year is being spent on motor gasoline antiknock agents by U.S. refiners. The dollar figure is based on compounded TEL fluid at 37.4¢/lb. (ingredients of the fluid include tetraethyl lead, at 60.75¢/lb.; ethylene dichloride, 10.25¢/lb.; ethylene dibromide, 29¢/lb.).

Antiknock fluids required for aviation gasoline are considerably differ-

ent. Herbst assumes that the average TEL concentration in these fuels, in the U.S., is 4.6 ml./gal. (the maximum allowable concentration for most aviation gasolines). At a retail price of 40.9¢/lb. for aviation TEL antiknock, says Herbst, the bill amounted to about $38 million in '58. But this will be a shrinking market, he emphasized, because of the predicted drop in consumption of aviation gasoline (*see table, p. 74*).

Combustion Deposit Modifiers: Use of chemicals — now consisting mainly of phosphorus in the form of tricresyl phosphate — to control combustion chamber deposits is increasing. An estimated 30% of total auto gasoline currently marketed on the East Coast contains a phosphorus-type additive and Herbst assumes that all premium gasolines will ultimately contain such an additive. The total phosphorus market in '65 is estimated at 2.71 million lbs., compared with 2.07 million used in '58. Cost of tricresyl phosphate is now 32.5¢/lb.; other commercially available additives are tabbed in the 29-36¢/lb. range. These modifiers are not now used in aviation gasolines, and there's apparently little interest in them.

Modest Growth for Antirust: A wide variety of chemical materials are used as antirust compounds. Some examples: unsaturated organic acids, alkyl acid orthophosphates, amine and ammonium sulfonates, fatty acid amines. Concentrations in gasoline may range from 1-10 lbs. of active ingredient per 1,000 bbls. of fuel. Herbst assumes a concentration of 3 lbs./1,000 bbls. and forecasts a demand increase from 4 million lbs. in '58 to 4.7 million lbs. in '65 (automotive uses); he predicts a decline in aviation uses from 570,000 lbs. to 320,000 lbs. in the same period.

Prices of available antirust agents range from 20¢ to $1/lb. (based on total agent). One agent, notes Herbst, contains 50% active ingredient, sells for 27¢/lb.

Many factors make accurate forecasting of antirust demands for automotive fuels difficult, but Herbst considers use of these materials in aviation gasoline "pretty well stabilized" and does not expect major changes.

Ditto for Antioxidants: Chemicals to prevent gum formation during storage of gasoline have created a growing market. Stability can be improved by various treatments such as caustic washing, acid washing, contact with adsorbent solids (e.g. activated clays) and partial hydrogenation. But it's frequently more economical to rely on addition of an antioxidant. Most common materials used for this purpose are: 2,-6-di-tert-butyl-4-methyl phenol; N,N^1-di-sec-butyl-*p*-phenylene diamine; 2,4-dimethyl-6-tert-butyl phenol; N-butyl-*p*-aminophenol.

Current prices of these materials range from about 80¢/lb. to $1.15/lb. of active ingredient. A "reasonably average" concentration, says Herbst, is 5 lbs. of active material/1,000 bbls. of fuel; the antioxidant bill for automotive gasoline in '58 was about $6-7 million.

Use patterns of antioxidants more or less parallel expected trends of antirust agents (*see chart, p. 72*). Consumption for automotive fuel is expected to increase from 6.66 million lbs. in '58 to 7.8 million lbs. in '65; demand for aviation gasoline will likely fall off from 684,000 lbs. in '58 to 381,000 lbs. in '65.

A class of compounds called "metal deactivators" are sometimes used in conjunction with antioxidants. Typical examples: N,N^1-disalicylidene-1, 2-diaminopropane; N,N^1-disalicylal ethylene diamine; salicylal-orthoaminophenol.

These are usually sold as concentrate in an aromatic hydrocarbon (e.g., toluene, xylene). Current prices range from about $2.25 to $6/lb. of active ingredient. Approximate dosage is around 1 lb. of active material/-1,000 bbls. of gasoline for cheaper metal deactivators. This market is expected to grow from 1.3 million lbs. in '58 to 1.6 million in '65. (This is automotive use only; current military specifications do not permit use of metal deactivators in aviation gasoline.)

The problem of controlling fuel induction system deposits may become more demanding, could lead to bigger markets for currently used—and as yet undeveloped — chemical additives. The variety of materials now used make market estimates difficult. So-called "oil types" are used in concentrations up to about 0.5% and may cost 50¢/gal; the "surface active" variety is considered effective in concentrations of about 12 lbs./1,000 bbls. of fuel (one such additive costs 95¢/lb.). The materials are not used in aviation gasolines.

Dye Market Brightens: Gasoline is dyed for a number of reasons, such as to warn of toxic TEL content when fuel is spilled, for distinction of brands and grades to aid handling at bulk terminals and to avoid inadvertent mixing and contamination.

Azo- and anthraquinone-type dyes are usually employed. The four most commonly used are: *p*-dimethylaminoazobenzene (yellow); benzeneazo-2-naphthol (orange); 1,4-dialkylamino-anthraquinone (blue); methyl derivatives of azobenzene-4-azo-2-naphthol (red).

Market forecasts for dye consumption in automotive gasoline and aviation fuel (*chart, p. 72*) are based on these "average" formulations: automotive, 0.6 lbs. dye/1,000 bbls.; aviation 0.8 lbs./1,000 bbls.

Jets Jolt Markets: Fuel additives markets in the past have been largely limited to heating oils and diesel fuels but the advent of jet-powered aircraft has provided new outlets for many additives. At present, nevertheless, only one additive is mandatory in formulation of military jet fuels—the corrosion inhibitor. Use of antioxidants and metal deactivators is now optional in military fuel and all three additives are optional in commercial jet fuels.

Here's how nongasoline additives sales will increase between '58 and '61, according to J. H. Kirk and H. D. Young of Sinclair Research Laboratories: military fuel corrosion inhibitors, from $400,000 in '58 to $539,000 in '61; commercial jet fuel inhibitors, $29,000 to $217,000.

Heating-oil additives sales will increase from '58 to '61, as follows: stabilizers, $2.55 million in '58, will

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NONGASOLINE ADDITIVE DEMANDS

ESTIMATED ADDITIVE DEMANDS FOR FUELS† OTHER THAN GASOLINE
(million pounds)

	'58	'59	'60	'61
MILITARY JET FUEL:				
Corrosion inhibitors	0.6	0.67	0.73	0.77
COMMERCIAL JET FUEL:				
Corrosion inhibitors	0.041	0.18	0.25	0.31
HEATING OIL:				
Stabilizer	2.67	2.73	2.79	2.85
Metal deactivator	0.086	0.088	0.090	0.092
Corrosion inhibitors	2.35	2.4	2.45	2.51
Pour depressant	0.071	0.075	0.077	0.08
DIESEL FUELS:				
Stabilizer	2.67	2.73	2.79	2.85
Metal deactivator	0.086	0.088	0.09	0.092
Corrosion inhibitors	2.35	2.4	2.45	2.51
Pour depressant	0.04	0.046	0.047	0.048

†CCDA report by J. H. Kirk and H. D. Young of Sinclair Research Laboratories.

Estimated U. S. Gasoline Demands

(billion gallons)

	Motor gasoline	Aviation gasoline
1958	55.9	3.2
1959	57.7	–
1960	59.5	2.5
1965	65.5	1.9

Composition of ethyl fluids

(percent by weight)

	Automotive type	Aviation type
Tetraethyl lead	61.4	61.4
Ethylene dichloride	18.8	0.0
Ethylene dibromide	17.9	35.7
Dye, kerosene	1.9	2.9

go to $2.86 million in '61; metal activators, $244,000 to $270,000; corrosion inhibitors, $2.24 million to $2.52 million; pour depressants, $21,000 to $24,000.

Diesel fuel additives sales will increase also. From '58 to '61, stabilizers sales will rise from $1.6 million to $1.71 million; metal deactivators, $151,000 to $163,000; corrosion inhibitors, $1.4 million to $1.5 million; pour depressants, $12,000 to $14,000.

Motor Oil Additives Boom: Spelling out the motor oil additives market, George Weamer of California Research Corp. delineated the 1959 picture.

Weamer put the total '59 motor oil additives market at about 683



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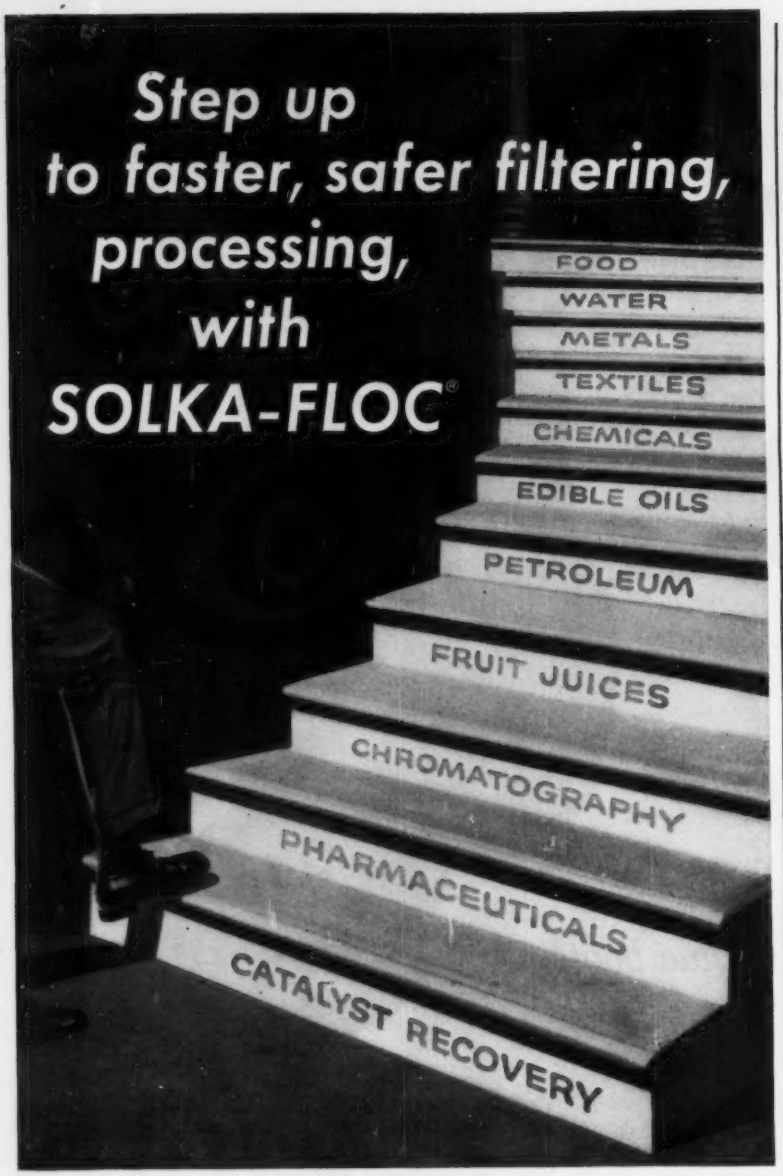
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million lbs., worth from $150 million to $175 million. His '59 breakdown (million lbs.): conventional detergent-dispersants, 325; viscosity index (V.I.) improvers and polymeric detergents, 160; oxidation and corrosion inhibitors, 100; extreme pressure (E.P.) additives, 60; pour point depressants, 30; foam inhibitors, dyes, etc., 8.

Other Petro-product Additives: An estimated $75 million is spent annually for additives in industrial lubricants, road oils, waxes and grease products, according to A. W. Lindert of Standard Oil Co. of Indiana. Accurate breakdowns of end-uses are very difficult to obtain but Standard's experts delineated the metal cutting-fluid market like this: cutting fluid use may be about 12 million gal./-month. Assuming a 2% concentration of sulfur-chlorine additive, the annual additive use is 25 million lbs. by American Society of Metals-represented plants alone, 50 million lbs. ($12.5 million) for the entire country. The market for other additives used in metal cutting was estimated at 30 million gal. of products representing approximately $10 million worth of additives.

Road oil additive markets were estimated this way: antistrip additives, 3,000 tons/year, worth $1.2 million; emulsifiers, 30,000 tons, worth about $2 million.

Many wax products require use of antioxidants, plus additives to improve gloss, sealing strength, scuff resistance, blocking (sticking during storage) tendencies, coating uniformity on cartons. An estimated 50,000 tons/year (worth $30 million) of additives go into wax formulations.

Total percentage of additives (if thickeners are included) in lube greases amounts to about 10%, says Lindert. In '56 and '57, annual lube sales averaged about 600 million lbs., worth $100 million. The additive-thickener portion of this totaled 60 million lbs., worth $20 million.

The CCDA forum presented probably the most comprehensive picture of the additives business yet offered. It's a complex business, but an expanding, money-making one for the CPI. It is, however, a field in which technological changes are forcing producers to rapidly develop new additives to meet new needs if they want to maintain high sales levels.

Potash Puzzle

Alleged shipment of Russian potash to the U.S. through the St. Lawrence Seaway (CW, May 30, p. 79; June 6, p. 78) remains a cloudy issue this week.

Latest observations — representing an importer's viewpoint—come from the Jay H. Co. of St. Louis, which includes Russian potash among foreign products it brings to the U.S.

Says Arthur Jacobs, president of Jay H., "Quite a few fertilizer manufacturers asked us more than a year ago to line up Russian potash because it was of good quality and they thought they could get it at a fair price."

"As far as price is concerned," he added, "we are competitive. It sells for about the same throughout the world. We do not enjoy a price advantage in the distribution and sale of Russian potash in the Midwest."

Jacobs explains that his firm is buying the potash on its own account and doesn't yet know how much can be sold. He says Jay H. isn't out to beat the markets — "couldn't beat them in any case because of high shipping costs and other factors."

The quality of Russian potash, Jacobs insists, is "better than potash that can be obtained here."

U.S. potash producers will, of course, take issue on the alleged superiority of Russian potash over U.S. material — have, in fact, already flatly stated that Russian potash is notorious for its nonuniformity and tendency to cake and lump (*CW, June 6, p. 78*).

Jacobs denies knowledge of others in the U.S. who might be buying Russian potash but points out that many thousands of tons have been sold in the U.S. during the past year (Commerce Dept. statistics show regular monthly shipments of potash to the U.S. from East Germany).

The importer remains mum about his role — if any — in reported Seaway shipments of Russian potash, but quotes 21-day delivery at dockside in Cleveland (the reported port of entry), Chicago, New Orleans.

There's no surplus of potash in the U.S. at the present time, Jacobs concludes, and potash supplies are now actually almost short. For this reason, he says, imported material doesn't hurt domestic producers.



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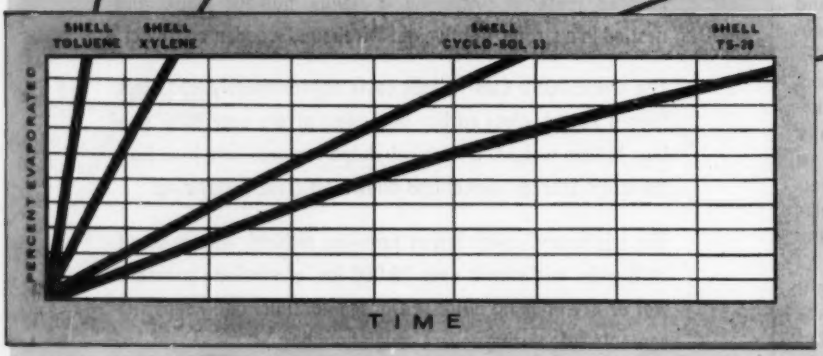
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Technology
Newsletter

CHEMICAL WEEK
June 13, 1959

A new vulcanizing process for butyl rubber that improves high-temperature resistance is now being used by all major tire manufacturers and several other companies under U. S. Rubber Co. licenses. Key to the new technique: use of phenol dialcohol resin in place of traditional sulfur as the butyl curing agent. Resin-cured high-temperature butyl (HTB) withstands sustained temperatures to 400 F, says U. S. Rubber, resists 700 F for short periods. Tire manufacturers' chief interest in HTB is for curing bags (the flexible innertube-like form used for tire-molding operations) that outlast standard butyl bags by as much as five to one.

•

Triamcinalone may be the answer to extreme sunburn, accord- to University of Pennsylvania physicians. The cortisone-derived drug, in pill form, gave complete relief to 14 badly sunburned patients within 24 to 48 hours. Drs. Milton M. Cahn and Edwin J. Levy, who have tested the drug, urged caution in its use, despite absence of side effects in the 14 patients. Triamcinalone—which can be obtained only by prescription—has been used to treat skin diseases, is made by Squibb (Kenacort) and Lederle (Aristocort).

•

Uses for inks, clay coating and fibers reclaimed from paper are being researched by the University of Washington's ceramics department. These materials, washed out during the reclaiming of magazine paper pulp by Simpson Paper Co. (Everett, Wash.), cause difficult waste-disposal problems. Waste sludge has been made, experimentally, into bricks of lighter weight than regular bricks, by the Lowell Brick Co., whose plant adjoins the paper mill. Simpson and Lowell are cosponsors of the research project.

•

A new rubber and asbestos insulator for solid-propellent rocket motors has been developed for the Navy by Astrodyne, Inc. (McGregor, Tex.). On test, insulation, of lower cost and lighter weight than currently used reinforced-plastic insulations, held the exterior of a motor case to about 200 F during a 3½-minute test period. Solid-propellent flame temperature during the test was in excess of 5500 F.

•

Firth Sterling will step up output of ultrapure special alloys in a Hopkins process melting facility now being built at its McKeesport, Pa., plant. The Hopkins process was developed by M. W. Kellogg Co. and has been operated on a commercial basis at Kellogg's Jersey City, N.J., plant. Essentially, it's a controlled alloying technique by which alloying ingredients are added continuously to a strip of steel as it is rolled into a tubular electrode. The tube is then arc-melted in a water-cooled crucible under a slag layer, which excludes atmospheric contaminants.

Firth Sterling purchased the process from Kellogg early this year, plans to move the Jersey City plant's three ingot melting machines

to the new McKeesport plant early next year. Each of these units turns out ingots up to 15 in. in diameter, 3,300 lbs. in weight. A larger unit, capable of making 4-ton ingots up to 20-in. diameter, is scheduled for completion late this year, providing a combined capacity of 800,000 lbs./month of special alloys.

•

Hercules Powder Co. has a $15,326,000 contract for research and development of a third-stage engine for the Air Force's solid-fuel Minuteman ICBM. Originally, Hercules had been working on a "limited program" to "thoroughly explore the potential" of double-base solid propellents as third-stage fuel for the Minuteman (*CW, Aug. 2, '58, p. 23*). The new contract is termed "definitization" of the previous agreement, represents a healthy go-ahead for the double-base fuel.

Hercules will do most of the work at its multimillion-dollar Bacchus, Utah, propellent facility, opened last December and still being expanded. Supplementary work will be done at the company's Kenvil, N.J., propellent plant. Other contractors working on propulsion stages for the Minuteman are Thiokol Chemical Corp. and Aerojet-General Corp.

•

Irradiation processing at one-tenth the cost of present methods may be commercially attainable with a new high-energy accelerator—the Dynamitron—unveiled last week by Radiation Dynamics, Inc. (Westbury, N. Y.). Key to the Dynamitron's low operating cost, says RD, is a simplified design that provides higher output ratings, permits equipment to be amortized over more pounds processed material at correspondingly lower cost per pound. Estimated cost: slightly over 50¢/kwh. for a 15-kw. unit (including amortization over 10 years).

RD foresees several radiation applications becoming "economically feasible." Radiation-vulcanized rubber, in which carbon-to-carbon bonds replace the conventional sulfur-to-sulfur bonds, has greater strength, higher heat stability and longer useful life. Practically instantaneous irradiation of plastics costs only a few cents per pound, in some cases less than chemical treatments. Numerous chemical applications, such as irradiation of paraffins to produce fatty acids and radiation-induced sulfoxidation, look feasible in the lab, but development has been delayed, chiefly by the high cost of previous radiation sources.

•

Montecatini is pilot-planting a new isotactic polymer—polybutene—which features high tear strength and resistance to chemicals. It is made from butene-1, a low-cost gas obtained in petroleum cracking, shows promise as a film for wrappings and coating. Polybutene films have been successfully laminated to paper, aluminum foil, textiles, and synthetic leather, the company reports. And sheets of the new material are potentially valuable in vacuum- and pressure-forming, cable coverings, and anticorrosive coatings and liners for chemical vessels. Because its stiffness is lower than that of isotactic polypropylene, polybutene is said to be particularly suitable for making sheets having "rather high" thickness.

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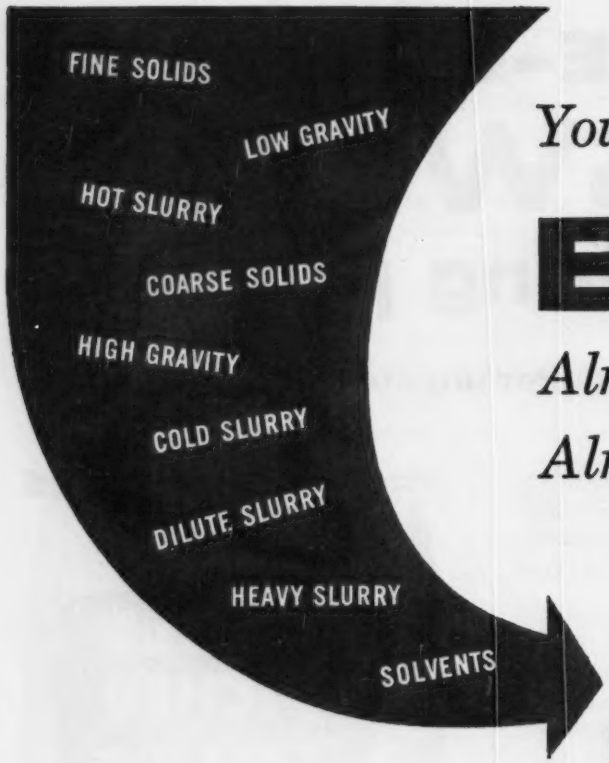
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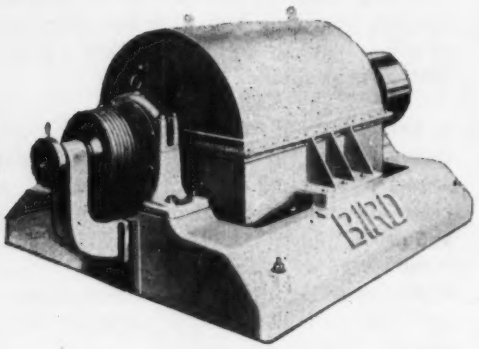
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WIDE WORLD

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Salesmen's Safety Gets the Hard-Sell

Highway crashes, the CPI salesman's main safety problem, are causing serious concern in the industry. Last week's CW survey of sales and safety management pinpoints these signs that the problem is mounting:

Most companies polled report a spurt in salesmen's traffic accidents in '58 over '57. One major firm showed a jump of 28%. And accident costs are climbing, too. Total cost per accident may average over $2,500.

As a result, more chemical companies, especially the larger ones with large sales fleets, are feeling the pinch of rising insurance premiums. To most, the message is crystal clear: auto insurance is no guarantee against the big bite of increasing damage and liability claims. How to trim costs? The only practical way is to minimize traffic accidents.

Hence, CPI companies across the nation are updating and intensifying their safety programs, and those without formal programs are initiating them. Monsanto Chemical Co. took steps in recent months to organize a fleet safety program. American Cyanamid has decentralized its nationwide fleet safety setup. Object: improved record-keeping and accident analysis through closer-to-the-scene regional control. Cyanamid hopes to spot its safety problems more quickly this way.

The Tally: Concern over salesmen's safety stems more from the skyrocketing cost of accidents rather than from any increase in tragedies. If this sounds mercenary, it actually isn't. In the past, CPI firms have been safety leaders in all their operations; and in recent years, salesmen have done well in avoiding crippling or killing accidents. Of 15 companies polled, there were five reported traffic fatalities since '54, an average of one per year for the aggregate of 15 firms. That's nothing to get alarmed about when you consider these companies had over 7,000 salesmen rolling millions of vehicle-miles during that time.

Much credit for the decrease in serious accidents must go to that lifesaver, the seat belt. One major company cites this record: in one year, salesmen using seat belts were involved in 24 accidents that were judged to have serious injury potential. Of the 24, 10 were uninjured, 11 incurred only minor scratches and bruises, and three sustained lost-time injuries.

But why all the sudden concern over accident costs? Simply this: property damages and bodily injury claims represent huge losses each year. Companies told *CW* that their costs per accident ranged from $130 to more than $1,300, with most companies estimating the tab at about $700 per accident. One large chemical producer breaks it down this way: its average accident costs $582, of which $165 covers vehicle damages and $417 pays for bodily injury and

Salesmen's Traffic Tally

How Five CPI Companies Fared on the Roads

	Industrial chemicals		Drug	Specialties	
	A	B	C	D	E
Number of salesmen drivers	1,400	1,000	1,100	1,500	72
Fatalities, '54-59*	1	0	0	1	1
Accidents subject to report	400	103	361	—	32
Accident frequency per 100,000 vehicle-miles	0.25	1.9	1.22	8.0	0.42
Percent of accidents preventable (estimated)	85	60	40	50	85
Average cost per accident	$777	$582	$230	—	$1,300
Total costs (all accidents)	$300,000	$60,000	$83,000	—	$13,000

* Fatalities cover a five-year period. All other figures represent a recent typical year.

property damage liability claims.

Insurance companies cover those losses, of course, but they're in business to make money. The more accidents and expensive claims, the more premiums must rise to cover the insurers' losses. Therefore, a company's insurance premium rate is tied directly to its safety performance. This doesn't mean that costs are the only concern, that fatalities and serious injuries don't occur. They do. And when they do, they can wreak havoc in a district office:

Death or serious injury leaves a company without an area representative until a shift can be made. Relations with customers, consequently, may be damaged.

Besides the high direct costs of accidents there are hidden costs: adverse publicity; damage to morale of other company employees; and the general drain on management for court appearances, realignment of territory responsibilities, etc.

Several companies estimate that these hidden costs count up to three or four times the total direct costs. This means that apparent costs of $700, a commonly reported figure, may actually involve losses of $2,500 per accident.

Company Programs: Because of the expense of providing transportation for salesmen (transportation is one of the major factors in sales costs) nearly all the larger companies have formal safety programs.

Scope of company safety programs varies widely. Some safety programs consist solely of good intentions. Others consist of occasional mailing pieces and awards for accident-free years. Comprehensive programs will include most or all of these points:

(1) Selection and screening of sales candidates to remove accident-prone individuals.

(2) Schooling for a several days' period in the fine points of traffic safety. Emphasis falls on defensive driving, first aid, auto repairs, local and state laws. One Midwest company noted it paid for driving lessons for a salesman who hadn't driven in eight years.

(3) Follow-up reminders to all salesmen, via mailers, conversations by sales managers, films, speakers, etc.

(4) Safety contests between districts and regions. Plaques, cards, and other forms of special recognition are awarded for top performance.

(5) Regular auto inspections.

(6) Outfitting of all cars with mechanical safety aids—e.g., seat belts, outside mirrors, first aid kits, road flares, fire extinguishers and padded dashboards.

(7) Penalty systems for poor safety records. Though this practice is rare, a few firms suspend private use of company cars if a man has several accidents. Also used at times: loss of pay. A valuable element in many safety programs is the assistance offered by the National Safety Council in organizing and managing fleet safety programs. One of its recent efforts: a new booklet titled "A Professional Code for Defensive Driving."

Why Accidents? Studies of accident patterns involving salesmen point to impatience—e.g., salesmen trying to squeeze in an extra call late in the day—as an important factor. Following too closely and driving too fast suggest this cause — so do minor scrapes such as backing up before looking or pulling out of a parking space before properly checking for clearance.

CW found that very few companies in the CPI had much experience with traffic lawbreakers. But nearly all agreed that it wouldn't take much of this kind of trouble to cause concern about a man's job fitness.

What about drinking and driving? Few companies had any reportable experience on this matter, but insurance company safety personnel tell *CW* that some 15% of all salesmen's accidents are probably due to driving after drinking.

Many CPI companies have volunteered the view that any man who becomes involved in this type of difficulty would jeopardize his job.

Other Accidents: Although traffic accidents are the chemical salesman's main safety problem, he occasionally is involved in other kinds of accidents. Typical: acid burns, strained and wrenched backs from improper

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lifting, and numerous other mishaps. One explosives salesman was injured when he inadvertently entered a mine soon after a charge had been detonated. In general, these accidents are unimportant, compared with the actual and potential loss resulting from traffic accidents.

Signs of a growing awareness of the traffic problem are apparent. As more companies realize the advantages of vigilant accident prevention programs, salesmen's safety records will undoubtedly improve. As plant safety programs have proved, strong preventive plans pay dividends.

Ending Film Deaths

Plastics manufacturers and processors are mobilizing this week a comprehensive effort to stamp out infant deaths caused by suffocation in polyethylene bags and to save an important polyethylene market. Spearheaded by the Society of the Plastics Industry, companies are launching a major educational drive to alert consumers to the hazards of polyethylene bag misuse.

A wave of infant deaths and suicides in recent months has triggered the "crash" educational program. Since Feb. 1, the U.S. Public Health Service has received reports from state health departments attributing 42 deaths to plastic bags. And the National Safety Council is predicting that the national toll will pass 100 before year's end.

Deaths have occurred principally from children sticking their heads into bags or from tiny infants being placed against bags used as mattresses or pillow covers. A smaller number of fatalities have occurred as a result of children stuffing the plastic into their mouths or noses. And in at least four cases, an adult has used a bag to commit suicide.

The national spotlight fell on the situation a few months ago when a Phoenix physician called attention to four infant deaths involving plastic bags.

But just recently, the Phoenix area medical examiner reported that of three deaths officially investigated, only one was caused by a plastic bag.

Market Threat: The spate of recent infant deaths is threatening to destroy a major polyethylene market. Currently, 40 million lbs. of the resin are used for garment bags and 90 million lbs. are used for fruit and vegetable sacks. Market forecasts place consumption in these two fields at 50 and 130 million lbs., respectively, in 1963 (*CW, May 9, p. 41*).

The threat is coming from moves on the part of the drycleaning industry to drop plastic bags, proposed legislation, and possible consumer rejection in the wake of wide publicity.

Already, major local drycleaners in Winston Salem, N.C., Knoxville, Tenn., Windsor, Ont., Pittsburgh, New York and Chicago have declared intentions to revert to the previously used paper bags. And, at a meeting to consider the problem, held by the SPI in New York last week, several PE bag makers claimed that sales were beginning to suffer.

In Washington, D.C., three bills have been introduced in the House. Those authored by New York's Stratton and Florida's Bennett would ban PE bags in interstate commerce; a bill by Wisconsin's Reuss would require warning labels.

The Florida State Senate has passed a bill requiring that plastic bags thinner than 1-mil gauge have openings wider than 6 in., that bags have a warning in reasonably large type. The bill is expected to pass the house and be approved by the governor. An attempt to legislate an outright ban on the bags was decisively defeated, following protests by the SPI. Legislation banning the bags or requiring a warning label is also pending in California, North Carolina and New Jersey. Bills may be introduced next year in New York.

Currently, the New York City Department of Health is considering an addition to its sanitary code requiring safety labeling. Proposals for legal action have also been voiced in Cleveland and Chicago.

Understandably, plastics producers are opposed to legislation banning bags. The bags themselves, they claim, are not inherently dangerous and deaths that have resulted have stemmed from misuse or carelessness. The industry, however, will offer no opposition to laws requiring printed warnings; already some bag makers have begun to safely-label bags.

The third major threat to the market may come from consumer rejection. Grim cartoons have already appeared in Camden, N.J., and Atlanta, Ga., newspapers. Many others



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SALES

have carried feature stories warning parents of the danger.

Education Push: There's wide agreement among industry officials, doctors and safety experts that the problem can best be solved through education rather than by law. The National Safety Council, for example, takes that position.

The SPI has already launched an educational drive, is considering a paid national TV and radio program of spot announcements. Several bag makers such as Technical Tape, Chippewa Plastics, and Kordite (a division of National Distillers) are starting independent programs.

Working closely with public health and safety officials, medical associations and drycleaning trade organizations, the SPI is distributing a warning leaflet. Pitch: bags are not playthings; discard after use. The National Institute of Drycleaning is distributing warning placards prepared by the SPI. Kordite, for example, is distributing a kit to drycleaners that contains press releases for newspapers and radio, posters for store display and tags for hangers carrying plastic bags. The SPI and individual companies may spend over $500,000 in the next few weeks on educational efforts.

Technical Solutions: Meanwhile, these technical solutions to the safety problem are being probed:

- Use of perforated bags.
- Use of a thicker gauge.
- Use of linear PE or a conventional PE of higher density than now employed. Koppers, for example, is testing a film that is stiffer and tears more easily.
- Application of anticling compounds to the film.

Some trade sources, however, are dubious about the value of perforations and anticling film properties.

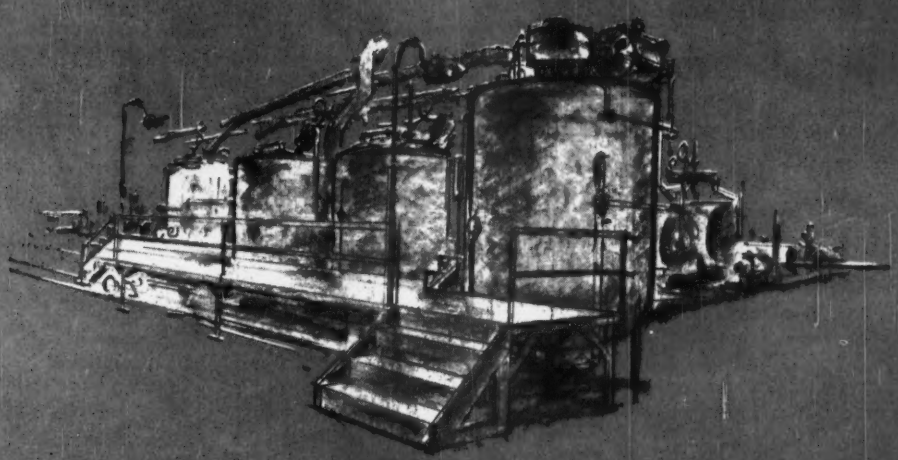
Emphasis in safety education is on speed. Only through a large, rapid and effective campaign can plastics producers and users stamp out fear and hold onto a growing market.

DATA DIGEST

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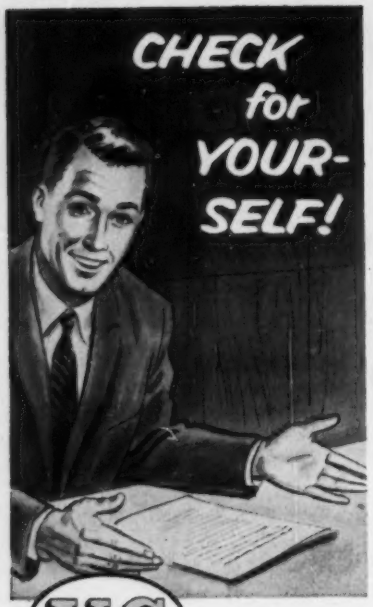
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SALES

moldings, wire and cable coating, coatings and several other areas. Spencer Chemical Co. (Kansas City, Mo.).

• **Polyvinyl acetate:** Bulletin describes properties of Vinac RP-250, a redispersible powder. Material can be used as concrete additive and bonding agent, in dry spackling compounds and in powder paints. Colton Chemical Co. (1747 Chester Ave., Cleveland 14, O.).

• **Alcohol applications:** Bulletin suggests defoamer and coupler uses for 2,6,8-trimethyl-4-nonanol. Its phosphoric acid derivative is recommended as an extraction agent for uranium ores. Union Carbide Chemicals Co. (New York).

• **Nonionic surfactants:** Family of alkylpoly-(ethyleneoxy) ethanols is described in new brochure. Materials can be used to stabilize foam in alkylaryl-sulfonate-type liquid detergents. Applications are also suggested in detergency, emulsification, dispersion and foaming. Antara Chemicals, General Aniline & Film Corp. (New York).

• **Silicone rubber:** Illustrated brochure highlights major applications of room-temperature vulcanizing type of silicone rubber, gives tips on correct use. Silicones Products Dept., General Electric Co. (Waterford, N.Y.).

• **Vinyl aging:** 16-page study reports results of outdoor light stability tests conducted on numerous polyvinyl compounds over a 24-month period at Phoenix, Ariz. Spotting, discoloration, stiffness and tack formation are evaluated in relation to the aging of each vinyl material tested. Argus Chemical Corp. (633 Court St., Brooklyn 31, N.Y.).

• **Cadmium, lead, tin:** Folder highlights properties and applications of the metals. White Metal Rolling & Stamping Corp. (Moultrie, Calyer & Humboldt Sts., Brooklyn 22, N.Y.).

• **Cerium naphthenate:** 12-page bulletin discusses relative merits of cerium and lead naphthenates in varnishes and enamels. (Kunstharsfabriek, "Synthese," N.V., Katwijk, Holland).

• **Alkyl aryl sulfonic acid:** Two bulletins discuss use of modified alkyl aryl sulfonic acid, Tenn-Acid 855, in textile and related industries and in organic solvent water systems that retain detergency. Tennessee Corp. (1330 West Peachtree, Suite 500, Atlanta 9, Ga.).

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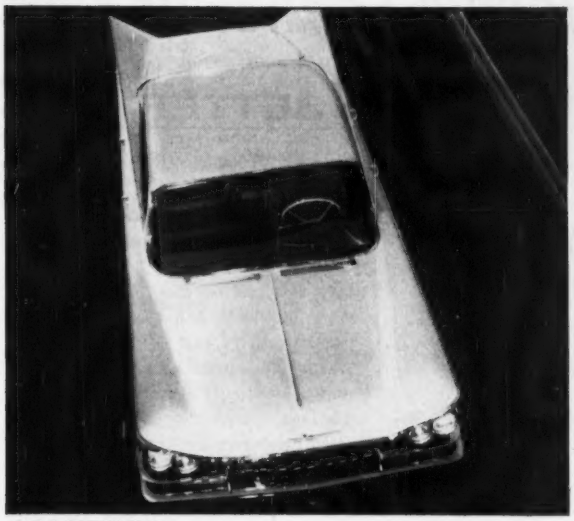
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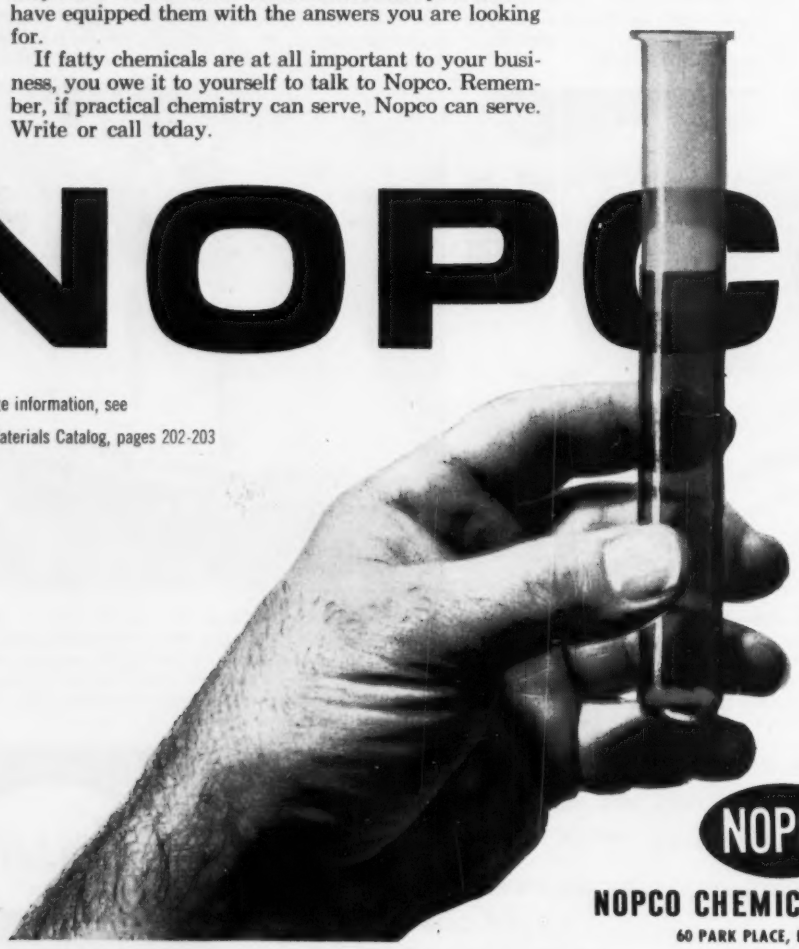
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He Solves the Outside Suggestion Problem

Handling suggestions from inventors and consumers has become an extremely touchy legal problem and, as some CPI firms have found, can be quite costly (CW, Aug. 17, '57, p. 107). But U.S. Rubber Co. has a novel approach, a single office with a technical evaluator, an idea that may be of use to others in industry.

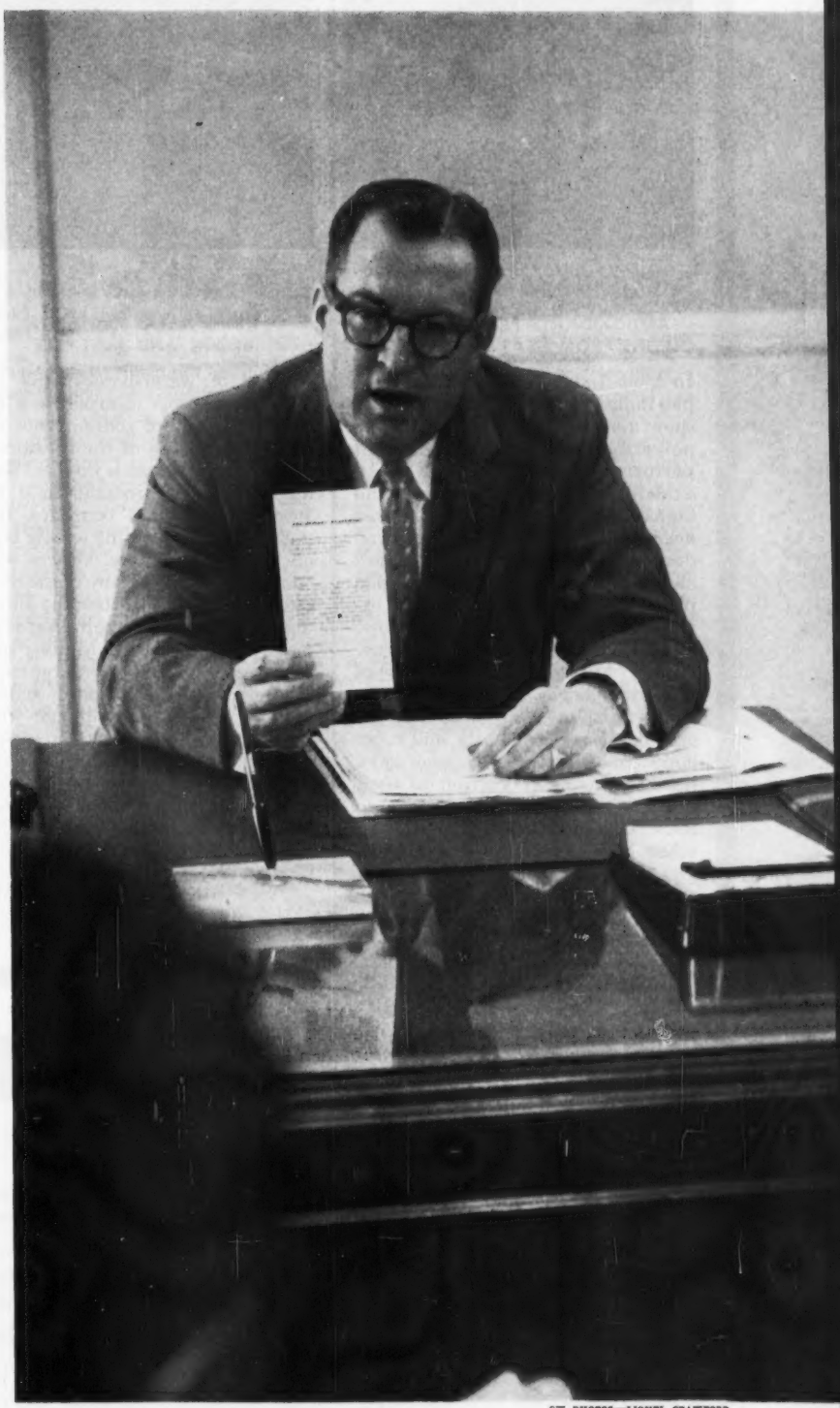
U.S. Rubber Co.'s idea, designed to keep inventors and research directors happy, is to use Ph.D. chemist George Graham as liaison, an "inventor's representative." This plan, rather than using office personnel, legal departments or the helter-skelter methods often employed elsewhere, has not only minimized trouble but is also profitable for U.S. Rubber.

For one thing, Graham is in a prime position to evaluate any suggestions, with a keen awareness of company policy and operations. Second, as a technically trained man, he is in a good position to work with technical people who write or take their ideas to the firm. He gives them confidence that they are getting proper attention.

About 40-60 suggestions cross Graham's desk each month. He spends two days a week on this job, the other three in the firm's patent office. Graham sends back those suggestions that have obviously been proffered before or are already used in commercial products and processes. He isolates all others to preclude donors' claims that their ideas were seen by research personnel.

Contributing "inventors" are sent a booklet describing USR's policy on suggestions and are asked for a release.

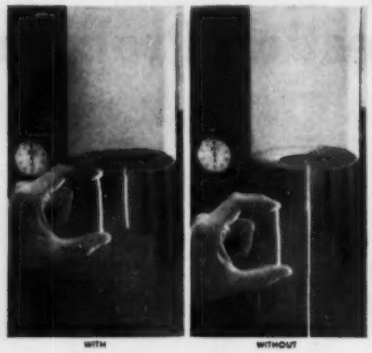
This is not one-sided, although it goes a long way toward protecting the company. It provides, basically, that no compensation will be forthcoming before the idea is completely divulged to top-level company personnel, and that no confidential relationship between any employee of the company and the inventor will be the basis for an acceptance of an idea. Approximately 95% return the signed release and their ideas are evaluated by Graham, then by research or production management (whichever is in



CW PHOTOS—LIONEL CRAWFORD

U.S. Rubber's Graham: 'Don't take second look without a release.'

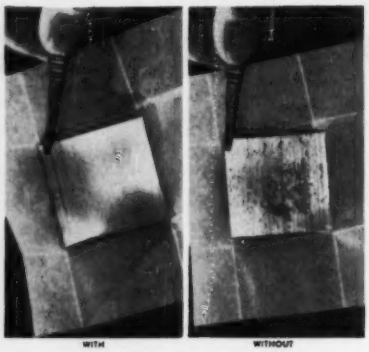
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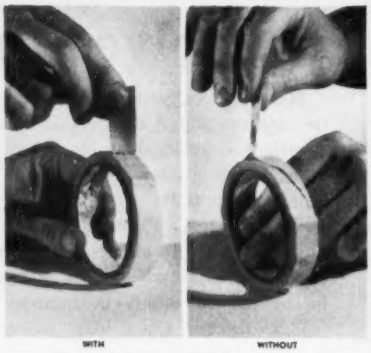
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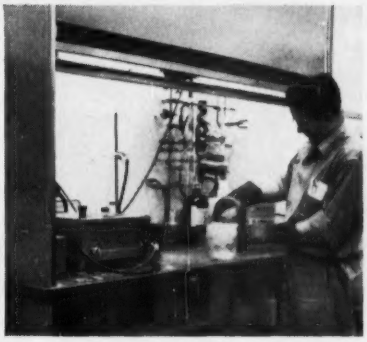
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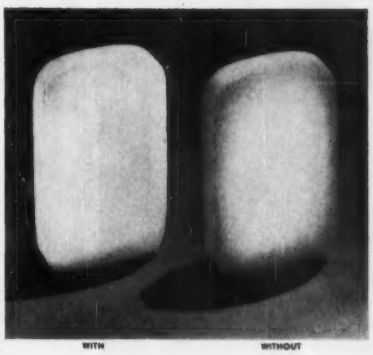
It imparts staying power to a variety of pesticides including DDT, heptachlor, Malathion, chlordane, aldrin and lindane. Example: under research conditions a sprayed-on mixture of 25% lindane, 25% AROCLOR, and 50% solvent enabled the treated surface to kill houseflies for 102 days . . . ten times longer than the same dosage without AROCLOR! On cockroaches, a lindane-AROCLOR mixture used at the rate of 50 mg. lindane per square foot, under exacting experimental conditions, still registered an 80% kill after 60 days. Straight lindane solution, same rate, same conditions, scored only a 4% kill. Soluble in a variety of solvents, low-cost AROCLOR 5460 is easy to handle and formulate. It is relatively nonvolatile, nonflammable, nonoxidizable, and shows no primary skin irritancy or sensitization. For particular uses, such as insect traps or tapes, other AROCLOR bonding resins might be used.



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'Isolate the suggestion for maximum protection against a legal suit . . . Patented ideas deserve a closer look than run-of-mill suggestions . . . Don't establish a confidential relationship with the inventor before accepting his idea.'

better position to do so). About 50% end up on the research director's desk.

As for ideas that are received directly by research or other company personnel, Graham advises, "Pick them up gingerly by one corner, carry them to my desk."

Wise Suggestors: Technical ideas (new processes, polymers, etc.) are sometimes sent in by private inventors but more often from patent brokers out to sell or license their client's patents. Most have no value. Companies prefer patented ideas; the patent is a guarantee that the idea is unique and probably could be exclusively used. Nontechnical ideas are usually seasonal (e.g., in the summertime there are bathing cap designs. These never get into research hands.

Other CPI firms besides U.S. Rubber have formalized the handling of outside suggestions. Most, however, haven't used technically trained personnel as part of their procedures.

Here's how some others do it:

Eastman Kodak. An Eastman spokesman told *CW*, "While we send out no leaflets or printed material (upon receipt of an idea), all suggestions are carefully answered, based on the form they were in when received. We ask the inventor or his representative to agree to certain conditions before we send the suggestion on to the research labs for evaluation. Unpatentable ideas are handled as if they were an "internal" suggestion from one of our employees; we ask the submitter to rely upon our general reputation for fair dealing."

American Cyanamid. Ed Archer, AC's patent attorney, says, "We handle suggestions on a tailor-made basis, have no rigid system. Of the technical suggestions we get, most are of little novelty or have no practical utility." He suggests that research directors "be on the lookout for suspicious-looking packages, which might contain technical material, which come from a home address or unfamiliar source. Turn it over, unopened, to the patent lawyers or other suggestion-handling office in your firm. They should request a release from the sender before opening it."

Warner-Lambert. W-L sends out legal-style releases with form letters over the assistant counsel's signature. It handles suggestions through its legal office. It is, as one W-L spokesman puts it, "a clean-cut, simple system."

Procter & Gamble. P&G has an office girl handle and "quarantine" all incoming suggestions. The firm "diplomatically tries to discourage ideas from outside sources because it finds them to be of almost no value, although they can be costly. The now-famous "Blue Cheer case," in which a woman suggestor sued the firm for several million dollars, claiming she had suggested the addition of bluing to the product, was settled out of court — in favor of the woman. P&G claims it uses the office girl to handle the suggestions deliberately, to prevent claims that technical personnel saw the ideas.

None of these plans, of course, is completely foolproof. For example, not all suggestions arrive by mail—it is not unlikely that virtually anyone at the management level may get ideas from acquaintances. These might be given either at the plant or outside it; they may be made verbally or, if a written suggestion, delivered directly. It is up to whoever is contacted to regard such suggestions with the same caution he would a suggestion by mail—and handle it—promptly.

With consumers, stockholders and inventors becoming more conscious of benefits derived by both themselves and companies from well-thought-out ideas, the problem of outside suggestions is due to become a heavier burden for CPI research management. If U.S. Rubber's experience is any gauge, it's probable that more companies will be adding "inventor's representatives" to their staffs.

CONCLUSIVE EVIDENCE OF THE SUPERIORITY OF CAUSTIC CLEANING FORMULATIONS CONTAINING Pfizer GLUCONATES!

If you compound caustic washing or cleaning formulations, you should put Pfizer Gluconates on trial in your formulas. Judge for yourself the economy and superiorities of caustic-gluconate formulations. Overwhelming evidence also shows that Pfizer Gluconates are stable, both in storage and in use, in caustic compounds.



EXHIBIT A

ONE SPARKLING CLEAN BOTTLE —The inclusion of Pfizer Gluconates in your formula will assure bottling customers of a compound which will give spotless results. Pfizer Gluconates have proven to be the product of choice for preventing formation of film on bottles and scale on equipment.

EXHIBIT B

ONE BRIGHT STRIP OF ALUMINUM —Pfizer Gluconates in your aluminum etching compounds prevent the formation of hard, adherent scale. Both Sodium Gluconate and Gluconic Acid increase caustic efficiency—you use less in your compounds yet assure your customers of a more uniform etch.

EXHIBIT C

ONE DE-RUSTED BOLT—Superior caustic rust removal compounds are now possible through the inclusion of Pfizer Gluconic Acid or Sodium Gluconate. In caustic solutions Pfizer Gluconates dissolve rust and prevent after-rust while increasing the efficiency and prolonging the life of the bath.

EXHIBIT D

ONE SHINY PIECE OF STEEL—Pfizer Sodium Gluconate and Gluconic Acid improve the effectiveness of your caustic paint stripping compounds by eliminating the usual brown layer of iron hydroxide. Also they permit freer rinsing of the paint-stripped metal.

THE VERDICT

The verdict is unanimous—Pfizer Gluconic Acid and Sodium Gluconate assure you of compounds with the highest cleaning and etching efficiency. Write Pfizer for complete technical data and information on the proper Gluconate use levels.

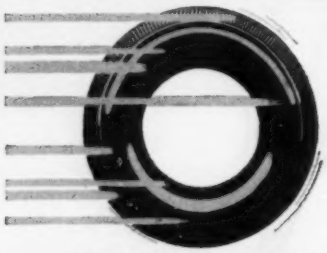
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COLLOID CORNER



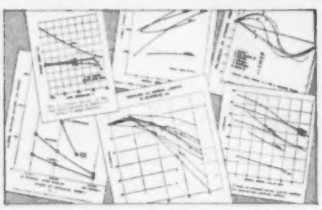
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DEPT. A

New Aspirin Rival

This week, many of the nation's physicians are evaluating a new analgesic, Soma, developed at Wallace Laboratories (New Brunswick, N.J.).

Soma's discoverer, Frank Berger (of Miltown fame), director of research at Wallace Labs, expressed this company's optimism about the product: "Soma may offer strong competition to aspirin, as an effective combatant of muscular pain." Chemically, the new pain reliever is N-isopropyl-2-methyl-2-propyl-1,3-propanediol dicarbamate; generically, it's called carisoprodol.

Berger's starting point was meprobamate. By substituting an isopropyl group for a hydrogen on one of the carbamyl nitrogens, he arrived at Soma. Berger says, "There are four similar positions of substitution on the molecule, but for some unexplained reason only one of the positions gives a compound with any medicinal effects. Result: yields are small. A Wallace Lab spokesman says, however, that the situation should improve with large-scale production experience of Soma.



Wallace Labs' Berger: Out of four possibilities, one paid off.

Cost Battle: Aspirin costs a small fraction of the prospective cost of Soma, retailing for as little as ½₀¢/-tablet in some stores. Soma, on the other hand, will be distributed to druggists at 8-10¢/tablet, to be sold to consumers on a prescription basis.

Berger says that features of Soma should overcome some resistance in its use, once doctors find what it is good for, and start prescribing it. These features include:

- Extremely low toxicity; large overdoses will cause only temporary sleepiness.
- Ability to relax spasticity; Soma reportedly was eight times more potent than meprobamate in tests on lab animals.
- Nonimpairment of defense reflexes in the body. (For example, if one puts his hand over a flame, he may not feel the pain but still will retract his hand.) This reflex is retarded by use of morphine, for example, and by use of many other potent synthetic analgesics, but not by Soma.

If the evaluation proves out the 1,400 or so clinical tests that have made, Soma can be added to the CPI's growing list of analgesics (*CW, May 31, '58, p. 41*) that are closing the gap between aspirin and morphine.

EXPANSION

- International Lubricant Corp. (New Orleans) has moved into its new, $850,000 laboratory and office facilities in suburban New Orleans.
- The Glidden Co. plans a new central research and development laboratory to be built in a Cleveland suburb at a cost of nearly $2 million. It will employ 75-100 staffers, serve Glidden divisional laboratories and, says the company, "will perform basic research and development work in new areas in which Glidden is not commercially active at this time." The lab site, 37.9 acres, is valued at $92,500.
- The Chemstrand Corp. will build a multimillion-dollar research laboratory in the Research Triangle Park of North Carolina—an area located in the center of a triangle formed by Duke University (Durham), the University of North Carolina (Chapel Hill) and North Carolina State College (Raleigh). Basic research will be moved to the new site from the firm's laboratories in Decatur, Ala.
- Convair Division of General Dynamics Corp. (San Diego) has dedicated a new high-temperature structures research laboratory costing $2 million. It will be used to simulate extreme loads and temperatures encountered in the high-speed flight of aircraft, missiles and space vehicles. The laboratory is the latest addition to Convair's $12-million research and de-



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RESEARCH

velopment center, which includes facilities for studying pneumatic and gas dynamics, thermodynamics, fuel and oil systems, etc.

• Experiment, Inc. (Richmond, Va.) will be acquired by Texaco, Inc. (New York) for expansion of Texaco research in high-energy missile and aircraft fuels and related work.

• Hooker Chemical Corp. has dedicated its new, $3.6-million research center at Grand Island, N.Y.

PRODUCTS

Gallium: Aceto Chemical Co., Inc. (Flushing, N.Y.) now offers gallium metal of both 99.999% and 99.99% purity.

•

Intermediates: Houdry Process Corp. (Philadelphia) has developed a process to make various imidazole derivatives, which are potentially useful as intermediates for pharmaceuticals, fungicides, optical bleaches, etc.

•

Tracer Price Changes: The Atomic Energy Commission has reduced the price of carbon-14 from $22-28 (depending on quantity purchased) to $13 per millicurie or fraction of a millicurie. The move affects companies routinely engaged in the preparation and sale of large quantities of carbon-14 — tagged chemical compounds, of which more than 1,000 are now commercially available. Other AEC price cuts are now in effect on chlorine-36, thallium-204, iridium-192, and iron-59.

•

New Standards: The National Bureau of Standards has added a new series of 10^{-9} and 10^{-11}-g radium standards to the list of radioactive samples it prepares and distributes.

•

Intermediates: Available in laboratory or pilot-plant lots from Columbia Organic Chemicals Corp. (912 Drake St., Columbia 5, S. C.) are the following: methyl cyclopropylketone; methyl cyclopropyl carbinol; 2-bromothiophene; fluoroacetic acid; 1,2,3-trichloro - 2 - propene; and 2,2-dibromo propane.

•

Multipurpose Grease: Esso Research and Engineering Co. (Linden, N. J.) has unveiled a new multipurpose grease that reportedly reduces wear more than one-third, has a thick-

ening system that uses calcium salts, allows lubrication under high temperatures (400 F) and pressures. The new product is said to equal other greases in resistance to water and in retention of oil content.

•

Graphite Offering: Under contract with the Superior Graphite Co. (Chicago), the Colorado School of Mines Research Foundation is piloting the production of low-ash amorphous graphite from Mexican deposits. It is intended for applications where amorphous graphite is now unacceptable because of ash content—e.g., in steel, pigments, nucleonics, lubricants, parts fabrication, and high-temperature applications. Small samples may be obtained from the Colorado School of Mines Research Foundation, Inc. (Golden, Colo.).

•

Antioxidants: Ethyl Corp. (New York) has developed a series of eight new antioxidants based on the parent compound 2,6 di-tert-butylphenol. The compounds are reportedly effective over a wide temperature range, are suggested for use in high-octane gasoline and jet fuels, engine oils and transmission fluids, rubber, plastics, foodstuffs, intermediates for dye production, pharmaceuticals and cosmetic products.

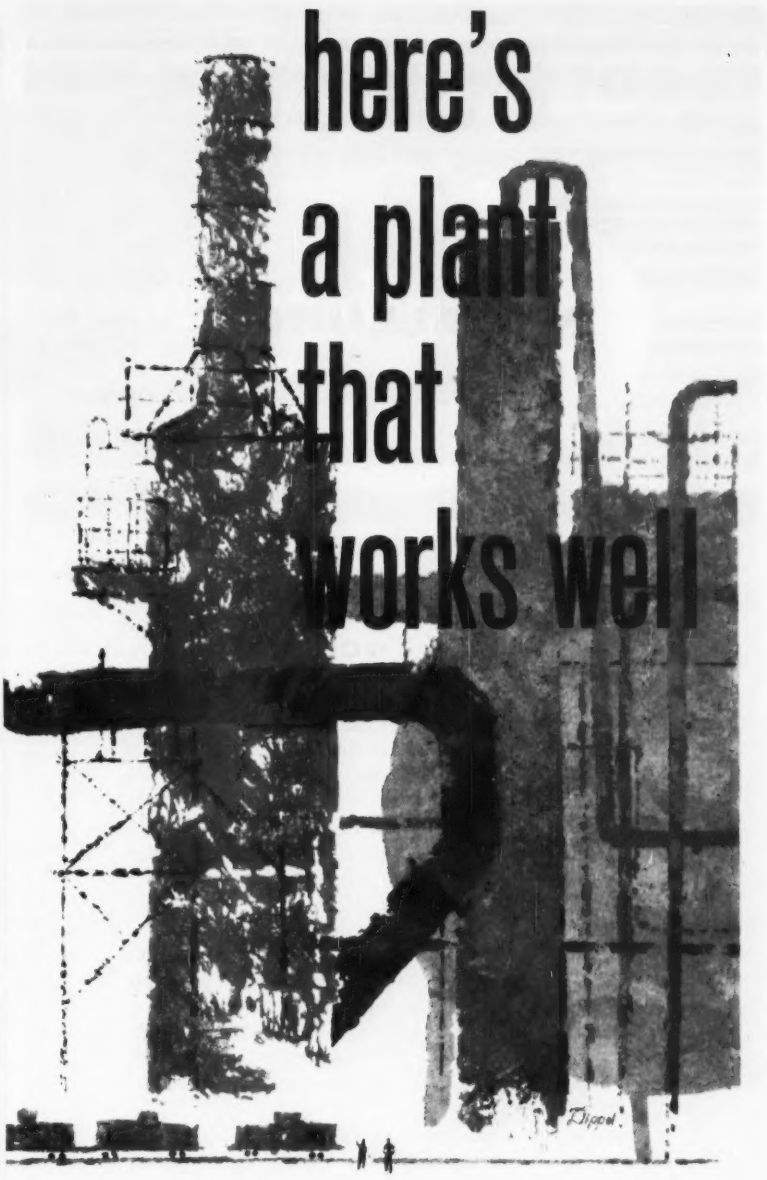
LITERATURE

• Copies of Technical Service Bulletin TS-4, One-Can Urethane Coatings, may be obtained from Allied Chemical Corp.'s National Aniline Division, 40 Rector St., New York 6, N.Y. One-can coatings are still experimental.

• "Products for Nucleonics" describes products and specialized services of Engelhard Industries, Inc. (Newark, N.J.). The brochure is free, covers such products as neutron absorbers employing mixtures of rare-earth oxides.

• Copies of a study on outdoor light-stability tests on a variety of polyvinyl chloride formulations—primarily those using barium-cadmium stabilizer systems—are available from the Research Division, Argus Chemical Corp., 633 Court St., Brooklyn 31, N. Y.

• "Handbook of High Voltage Electron-Beam Processing" is available by writing on company letter-



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RESEARCH

head to Bulletin P, High Voltage Engineering Corp. (Burlington, Mass). It answers questions on types and sources of radiation, developing radiation processes from research, engineering factors in design, efficiency of electron-beam utilization, beam power output and production capacity, installation and use of electron accelerators and the economics of radiation processing.

• A new data sheet on yttrium metal is now offered by Nuclear Corporation of America (Burbank, Calif.). Included are characteristics of the rare-earth metal regarding thermal properties, crystal structure, electrical properties, and some corrosion data.

APPARATUS

Tensiometer: Quick determination of the surface and interfacial properties of serums, oils, inks, colloids, and surface-active materials is possible with the Model 20 Tensiometer, a new instrument offered by Fisher Scientific (Pittsburgh). Price: $495.

•

New Spectrograph: A new plane grating spectrograph developed by Jarrell-Ash Co. (Newtonville, Mass.) is designed for research where the light source is weak, or of normal brilliance but fleeting. Called the Jarrell-Ash High Aperture Grating Spectrograph, it has been successfully used to record the spectrum from shock tube-plasma experiments (duration 4-5 microseconds), according to the manufacturer.

•

Polymer Checker: A new instrument for measuring penetration hardness and resiliency of polymeric materials is offered by Thwing-Albert Instrument Co. (Penn St. & Pulaski Ave., Philadelphia 44, Pa.). It is called the Continental Plastisol Cure Tester, is manufactured and marketed by Thwing-Albert under exclusive agreement with Continental Can Co., which developed it. The tester features sensitivity, ease of operation, accurately measures the cure of polymeric materials from 125 mils down to 0.7 mils thick.

•

Particle Collector: American Instrument Co., Inc. (Silver Spring, Md.), is out with a new instrument called the Thermopositor. The device collects minute particles and deposits them on filter paper, electron microscope screens and other substrates.

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nonionic surfactants

Foam Stabilizers — Solubilizers — Detergency Boosters — Emulsifiers

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Market Newsletter

CHEMICAL WEEK
June 13, 1959

Mexican sulfur is staging a comeback this quarter after a setback earlier this year. Major producer Pan American Sulphur reports it delivered more than 100,000 long tons of sulfur in May—10,000 tons more than in April and a one-month delivery record for the firm. Pasco sulfur shipments in the second quarter are expected to total 250,000 tons; this indicates that '59 production may exceed the 800,000 tons Pasco turned out in '58 from its Jaltipan, Veracruz, mines.

Pasco's record May sales have considerably brightened the company's outlook. Earlier this year, it—and other firms in Mexico—cut back plant production because of a decline of 40,000 tons in Mexican sulfur exports (*CW Market Newsletter, Feb. 28*).

And north of the U.S., more sulfur is on the way. A new sour-gas processing and sulfur extraction plant has gone onstream at Okotoks, near Calgary, Alta. It's jointly owned by Texas Gulf Sulphur, Devon-Palmer Oils, Ltd., and Shell Oil Co. of Canada, Ltd.

The installation is designed to process 30 million cu.ft./day of sour gas, can turn out 370 long tons/day of sulfur. It's another step in Canada's continuing program to conserve and market the Dominion's huge natural gas-derived sulfur—much of which will undoubtedly find its way into U.S. markets. Latest prediction of Canadian sulfur output: 1 million long tons/year by '61, 2 million by '65, 2.5 million by '70 (*CW Report, Sulfur, May 16*).

To finance its part of the joint Canadian sulfur venture Devon-Palmer dipped into U.S. financial reserves, according to President Morris Palmer. The firm closed a deal to borrow $3.5 million from Mutual of New York—$2 million was made available immediately, $1 million was due on completion of the plant, the rest later.

Construction of two more Canadian sulfur plants will be pushed by Jefferson Lake Petrochemicals of Canada, although the firm's current sulfur operations wound up this year's first quarter $75,000 (Canadian) in the red.

Indicative of the long-range optimism in Canada's sulfur industry is Jefferson's calling for bids, in the next two months, on a 900-tons/day sulfur recovery plant at Calgary and a 375-tons/day unit at Savannah Creek, some 130 miles southeast of Calgary.

One hope of easing world sulfur marketing problems is pinned on possible formation of an International Sulfur Institute—reportedly patterned after the American Petroleum Institute—which would have headquarters in New York and in Europe. Objective: coordinate producer activities in developing sulfur uses, markets.

A 50% reduction on radioisotope carbon-14 was posted last week by the Atomic Energy Commission. Effective June 1, the price per millicurie drops from a range of $22-28 to a relatively low $13.

Tags on less-commonly used radioisotopes have also been lowered (cost/millicurie): chlorine-36, reduced, from $1 to 50¢; thallium-204, from $5 to $1; iron-59, from $50 to $30.

Prices of these were increased (cost/millicurie): calcium-45, upped from $5 to $6.50; copper-64, from 20¢ to 80¢; gold-198, from 2¢ to 6¢; sodium-24, from $2 to $7; yttrium-90, from $2 to $3.

New price of iridium-192 is $6/curie, plus source selection charge of $40; former prices were $15 each for the first two curies, $2 for each additional curie.

•

Last week's cut of tantalum metal price to "$35, down from $60" by Union Carbide Metals has brought comment from competitors that Carbide has been selling close to the $35/lb. level for some time.

Carbide's answer: the $60/lb. tab on "high-purity tantalum melting stock" was always considered a list price subject to negotiation on large-volume orders. Some might have gone for about $35; small lots, on the other hand, may have sold near list. Point is, UCM emphasizes, no one will now pay more than $35/lb.

•

Allied Chemical's return to prerecession pricing schedules on nitrogen fertilizer solutions means that the current price of $120/ton will hold through September, when the fourth-quarter tab will be upped to $124/ton. It will go to $128/ton Jan. 1.

•

Russian and East German interests reportedly have tried to sell potash to Canada Packers, but CP won't take any of the offerings this year. Canadian sources (while also reporting that Russian material is moving into U.S. ports) say that Canadian potash would have to be cut 2½-3¢/unit of potassium oxide to be competitive (*CW, June 6, p. 78*).

SELECTED PRICE CHANGES — WEEK ENDING JUNE 8, 1959

	Change	New Price
UP		
Linseed meal, extracted, 34% bulk, ton	$2.00	$62.00
DOWN		
Cottonseed oil, refd., tanks	0.00375	0.16125
Mercury metal, 76 lbs. per flask	2.00	243.00
Methylene chloride, tech., dms., c.l.	0.005	0.135
Peanut oil, crude, tanks	0.1325	0.0025
Tankage, 9-11% ammonia, N.Y., ton	0.25	6.00

All prices per pound unless quantity is quoted.

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Gravity, °API	31.0
Weight, lbs./gal.	7.251
Color	Less than 0.001 gr. $K_2Cr_2O_7$ per liter of water; 30 + Saybolt
Distillation—IBP	110.0°C.
DP	110.8°C.
Paraffins	0.04%
Acid Wash Color	Less than No. 1 color standard
K.B., Toluene	105
Flash TCC	46°F.
Mixed Aniline Point	50°F.
Volume % Aromatics	99.95+
Sulfur	Free of H_2S, SO_2

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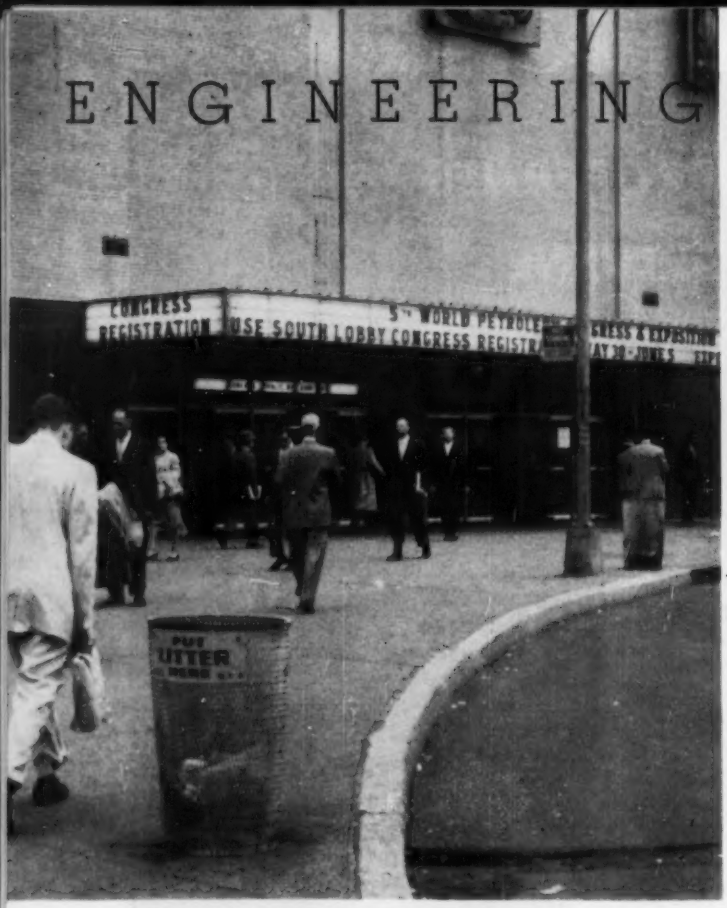
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What They Learned at the

It's been said that if you stand on the corner of Times Square and Broadway long enough, you'll meet everyone you ever knew. If your circle of acquaintances were confined to the world's top petroleum scientists, chances are you could have met them all last week as New York City played host to the Fifth World Petroleum Congress.

Engineers and scientists from 48 countries were represented. By mid-week, attendance passed the 4,300 mark; it was expected to top 5,000 by the time the final count was in.

It was a high-level gathering, too. At the working sessions and the exposition (in the Coliseum), at the kick-off session (in the Grand Ballroom of the Waldorf) and in informal gatherings in hotel suites all over the city, top-level scientists and corporate officials were brought up to date on the latest accomplishments in petroleum technology.

Mostly for Prestige: At the exposition, an integral part of the congress, most prominent displays were put on by the engineering construction firms. Kellogg, Scientific Design, Fluor, Lummus, Chemical Construction and other U. S. firms had impressive booths. Representation from foreign firms included such names as Friedrich Uhde (Germany) and CPIT (Italy). But equipment companies, petroleum refiners and a few chemical companies were there, too.

The common denominator for the exhibits: an absence of hard-sell.

For chemical management men, the high points of the congress were the technical papers dealing with petrochemicals. Several new processes were revealed, trends were pinpointed and some challenges for research and engineering were spelled out.

For instance, Standard Oil of Indiana told, for the first time, the secret behind Amoco's process for the liquid-phase, catalytic, air oxidation of xylene isomers or mixtures: use of heavy-metal catalysts (e.g., cobalt, manganese, molybdenum) — preferably as salts — in the presence of either free bromine or a bromine compound.

Actually, of course, the firm's foreign patents and applications had attested to the use of bromine as long as two years ago (*CW Technology Newsletter, March 9, '57*). In any case, the Indiana Standard investigators gave credit for the basic discovery to Mid-Century Corp., formerly an affiliate of Scientific Design, now owned by Indiana Standard. On the status of the 60-million-lbs./year plant at Joliet, Ind., they said only that "commercialization is well under way." (Reportedly, the plant is having start-up difficulties, a not-unexpected development for such a new process.)

Probably more important than the statements on the process as now employed were the hints given concerning future applications for it. Trimethyl benzenes can be converted into tri-acids (mesitylene into trimesic acid, pseudocumene into trimellitic acid) and tetramethylbenzene to tetracarboxylic acid (durene into pyro-



THEY LISTENED to Teller, other top-level scientists . . .



CW PHOTOS—MARSHALL

THEY LOOKED at exhibits of foreign and domestic firms.

World Petroleum Progress

mellitic acid). In fact, the firm made trimellitic anhydride available in developmental quantities last year.

The naphthalene nucleus, like the benzene nucleus, is stable under the operating conditions, so mono- and polycarboxylic acids can be produced. Because of the potential availability of alkyl naphthalenes from petroleum fractions, Indiana Standard sees "interesting future prospects" for this type of operation.

The technique can also be adapted to alkylated heterocyclic ring structures. Thus, 3-ethylpyridine can be oxidized to nicotinic acid.

Vying with the Indiana Standard process as a route to terephthalic and isophthalic acids is a new process described by Shell. It consists of reaction between benzene and propylene to form di-isopropylbenzene, followed by a catalytic, liquid-phase oxidation to the corresponding acid.

Shell has been working on this process for some time (*CW, April 6, '57, p. 42*). Others have, too. In fact, Scientific Design developed a terephthalic acid-from-di-isopropylbenzene process before it uncovered the bromine-activation gambit that makes the Indiana Standard process go.

Shell, however, says it has improved and revised its version of the process several times. It has been put through its paces on a ¼-ton day pilot plant. It concludes that for European conditions — with a "realistic price for *para*-xylene" — the Shell method "showed distinct advantages over all competitive routes."

More Aromatics: A provocative paper on the utilization and future for aromatics was delivered by a quartet from Humble Oil. Looking at the present utilization of aromatics and noting that they are a mere fraction of the available potential, they conclude that petroleum aromatics are still in their infancy. It is not, they feel, out of bounds to expect a several-fold increase in the next decade. The size of the increase, they point out, will depend largely on the quantity and quality of the research effort, particularly on derivatives of toluene, xylenes and higher-molecular-weight aromatics.

In the C_8 family of aromatics, the Humble group sees a major research and engineering challenge in the development of new techniques for separating *meta-* from *para*-xylene and for separating ethylbenzene from those same xylene isomers.

A number of C_9 aromatics are produced in a refinery reformate. But the most important ones, they feel, will be the three trimethylbenzenes: pseudocumene (1,2,4-trimethyl); mesitylene (1,3,5-); and hemimellitene (1,2,3-).

Pseudocumene (which makes up 41.3% of the C_9 reformate stream) can be separated out by distillation. Mesitylene (7.6% of the stream) is more difficult to obtain. It can be produced by combination distillation and crystallization. Yields, however, are low. Hemimellitene (8.2% of the stream) can be produced in high

(95%) purity by a combination of close heart-cut distillation and subsequent crystallization.

The important C_{10} aromatics, according to the Humble forecasters, will be the tetramethylbenzenes: durene (1,2,4,5-) and isodurene (1,-2,3,5-). Durene in particular—because of its molecular symmetry — is winning much attention (by Shell, Sinclair and Humble). Its high freezing point (175 F) permits it to be separated and purified by fractional crystallization. A raw material for pyromellitic dianhydride and acid, it also shows promise as a curing agent for epoxies, plasticizer for vinyls and in copolymers for laminates and plastics. Because of its promise and limited availability (8% of the C_{10} reformate), synthetic processes may be called on to meet demands.

Both Shell and Humble have developed processes for making durene from other methylbenzenes, especially pseudocumene. The Shell process is a vapor-phase reaction, using methanol as the methylating agent. The Humble process is a liquid-phase methylation, employing methyl chloride in the presence of aluminum chloride catalyst.

Isodurene (which makes up 12.7% of the C_{10} reformate) is present in high concentrations from the filtrate obtained in crystallizing durene. But purity of the product is limited by the narrow spread of boiling points between durene and isodurene. About 90% is the best that can be expected.

And Less Aromatics: The abundant supply of aromatics is, of course, a situation peculiar to the U.S. Pointing this up was a paper by two Israeli scientists who described a process for making detergent alkyl sulfonates. The object: to find a nonbenzene-based detergent that could do the job of alkyl aryl sulfonates.

In brief, the process consists of dearomatizing fuel oil with oleum. The oil is then oxidized, forming hydroperoxides. These are treated with sodium bisulfite and the products, alkyl sulfonates and carboxylic acids, are extracted.

The sulfonates reportedly are highly soluble in water and salt solutions, have good wetting properties, low foam, and excellent detergency.

As the Israelis see it, the process offers distinct advantages for their country. At present, detergent alkylate is imported, meaning that 70-75% of the cost of detergents is in foreign currency. This is slashed to 30% by the new process.

The economics are somewhat complicated, however, by the production of the carboxylic acid by-products. Some of this will be used in the country, the rest available for export. Thus, part of the cost of imported materials will be further offset by this export market. By the same token, the cost of the sulfonate will fluctuate with the export market for the by-product.

Two from France: Two new processes were described by researchers from the Institute Francais du Petrole, Rueil-Malmaison (S. & O.):

Noting the importance of *cis*-polyisoprene as a substitute for natural rubber, one group turned its attention to the problem of finding a commercial process for isoprene. The result: a two-step process starting with isobutene. This is condensed with formaldehyde to produce a cyclic formal of a 1,3-diol. This is converted into a conjugated diolefin having one more carbon atom than the original starting material.

Advantages of the process: high yields, direct utilization of a C_4 olefinic fraction without preliminary separation of isobutene, mild operating conditions and a product that contains isoprene as the only C_5 hydrocarbon.

The first step of the process has been operated in a pilot plant (2 liters/hour) and data is available for scaling it up. The second step has been studied on a bench scale and is now being piloted.

The process is bound to nail down considerable attention from U.S. companies. In fact, at least one company in the Southwest is reportedly looking at it seriously.

The other French process dealt with the production of conjugated diolefins by the hydroperoxidation of olefins. The first step is a liquid-phase hydroperoxidation, which gives only one oxygenated product, a hydroperoxide in alpha position to the double bond. This is reduced to an alcohol, which can be easily dehydrated to produce the desired diolefin.

The French scientists conclude: the method is particularly economical for making the α-ethylenic alcohols and their diolefins and seems, at present, the only one that can be used industrially.

What's Ahead: Turning its attention to longer-range technological developments that are expected to have impact on the petroleum industry, the congress for the first time devoted one section of the program entirely to atomic energy.

At an opening-day session, Robert Wilson, retired board chairman of Standard Oil of Indiana, sized up atomic energy's potential as a competitor. His opinion: the atom as a source of energy will have very little effect on the development of the domestic oil business in the next 25 years.

The principal oil market that might be threatened by atomic power in the next two or three decades, said Wilson, appears to be that of fuel for central generating stations. But only about 2.5% of our total heavy fuel oil is used for power generation in central stations—and this accounted for only 6.4% of our central station power in '58. The oil industry won't be disturbed if it loses all of this utility business in the next decade, said Wilson. It will merely continue the process of converting heavy fuel oil into more valuable products.

As for the large-volume oil products—gasoline and heating oils—Wilson feels they are "well protected against nuclear competition." Reason: the high costs of nuclear-powered engines and the heavy shielding required for protection against radiation rule out atomic automobiles, trucks and tractors and nuclear furnaces for home heating. It appears that there will be a tremendous and growing demand for liquid fuels for a long time to come. And in the distant future when oil is not able to supply all the demand, Wilson predicted, we will make liquid fuels from coal, oil shale and tar sands. In view of these considerations, he regards atomic energy "not as a competitor, but as something which will come along in the nick of time to help fossil fuels carry the burden."

Recovery Tool: Looking ahead to the time when oil-shale and tar-sands recovery will be required, Edward Teller, director of the University of California's Livermore Laboratory, described the possibility of utilizing nuclear explosions to unlock underground deposits. With a word of caution on a number of problems that still must be solved—such as radioactive contamination of the released

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oil products or of underground waters — Teller predicted that underground atomic blasts may enable producers to tap these resources at a cost of a few cents per barrel.

Illustrating his talk with movies of underground test blasts in Nevada, Teller characterized the operation as an *in situ* heating process, utilizing a nuclear device to produce a tremendous quantity of heat, which then remains stored in the underground reservoir created by the blast.

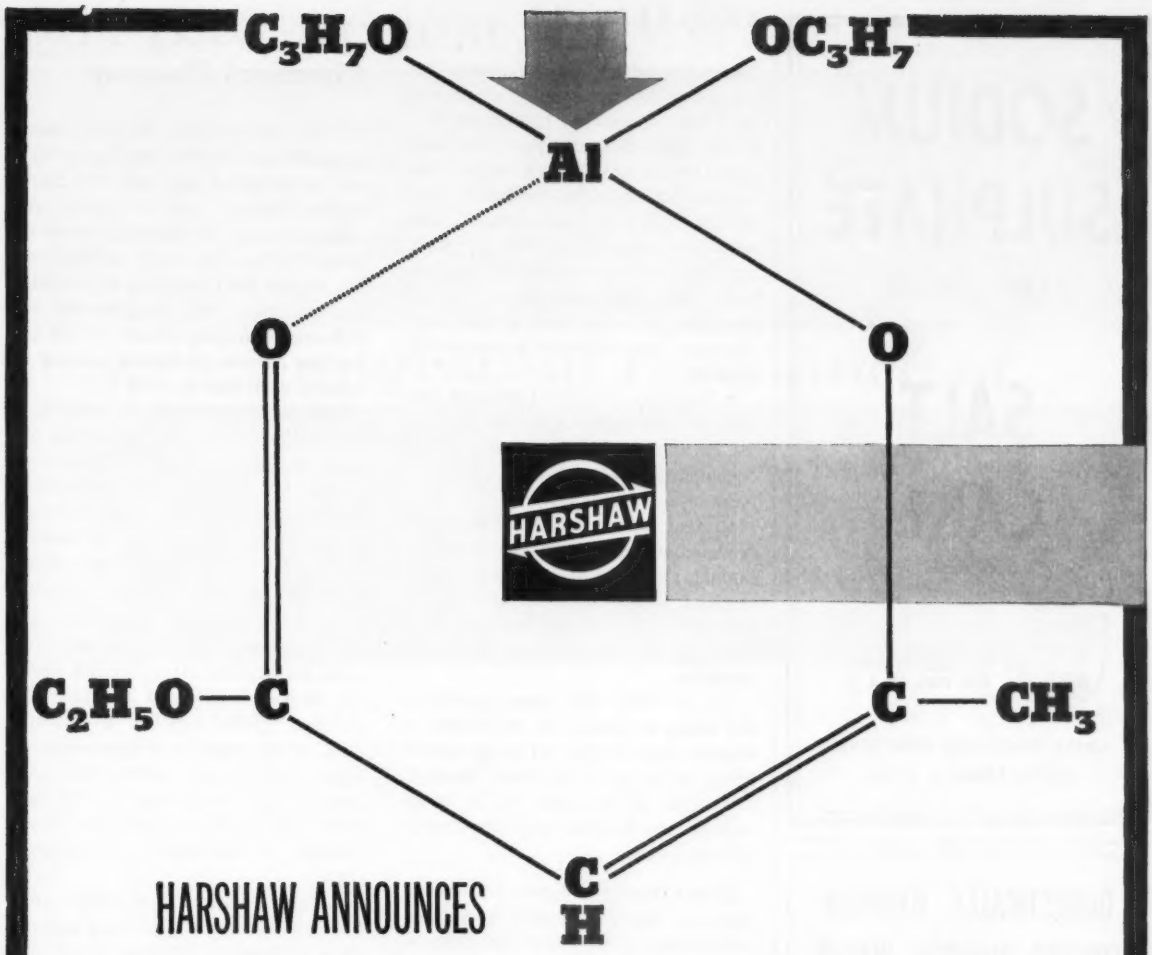
"We can make big holes in the ground, and make them cheaply," said Teller. And because the cost of the released energy decreases as the size of the atomic device increases, nuclear blasting of oil shale or tar sands is expected to cost only one-tenth as much as doing the job with TNT.

Some of the technical and economic aspects of utilizing radiation as a tool for more conventional petroleum operations were described at a second-day session by Clark Goodman, director of research at Schlumberger Well Surveying Corp. (Ridgefield, Conn.). In a brief review of the petroleum industry's extensive nuclear research, Goodman singled out five nonpower applications of atomic energy that are considered to be among "the more promising possibilities."

• Organic moderated reactors—one of the eight major types being investigated by AEC — afford the opportunity to process materials on a continuous basis in the organic moderator-coolant stream. Citing the work done by Atomics International on the organic moderated reactor experiment (OMRE), Goodman pointed out that a large number of radiation-induced decomposition products have been identified in the organic stream. He added that it's still too early to determine the value of such products, but suggested that this processing principle is "worth further consideration by the petrochemical industry."

• Process heat reactors (*CW, March 14, p. 55*) are also of interest to petroleum processors, not only for their potentially economic generation of low-temperature process steam but also for such high-temperature uses as coal gasification for the production of liquid fuel or synthesis gas, cracking of natural gas to form acetylene, and the synthesis of hydrocyanic acid from methane and ammonia.

• Radiation-initiated processes ex-



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W-1119	209-213°F	18-22	2-4	5-6
W-1120	207-212°F	24-26	3-5	5-6
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hibit some advantageous features, but are generally more costly at present than the conventional techniques with which they must compete. To date, polymerization is the only major commercial process using radiation (principally from linear accelerators). But with the reduction in cost of more intense sources of radiation—i.e., reactors and radioisotopes — several other petroleum and petrochemical applications may become economically feasible.

• Radiation-resistant lubricants present a challenging new market for the petroleum industry, have sparked considerable research and development of special materials.

Present commercial developments of these new processing techniques are limited, said Goodman, by the greater costs of nuclear methods and by the lack of knowledge of how to solve some of the more serious technical problems.

At the rate that these problems are being explored, he concluded, it appears that another 10 years should bring us to the point where reactors will begin to be used on a broad scale in the chemical and petrochemical industries.

Future Energy Source: Oil shale's roles in future domestic operations and in existing production facilities in Sweden were discussed at the opening session on drilling and production techniques.

Researchers from The Swedish Shale Oil Co. (Kvarntorp, Sweden) described two major improvements that have quadrupled the throughput of the Bergh-Kvarntorp pyrolysis retort and a new pyrolysis-gas treatment—the AVOX process—that improves recovery of gaseous products by removing oxygen catalytically.

A review of shale oil's domestic status by Union Oil's Fred Hartley and Claude Brinegar echoed the consensus of many unofficial, corridor discussions: it will be used in the U.S.—but the timing of its commercial debut is impossible to predict. Oil discovery per foot of exploratory drilling continues to drop, the Union officials pointed out, while per capita consumption continues to rise. Result: a slow but sure push toward other sources of liquid energy. Union's convinced that oil shale stands at the top of the list of alternate sources, says it's just a matter of time.

Chemical Cleanup

Mounting demand for high-purity feedstock for ethylene and polyethylene manufacture may stir up a lively process dispute over the most economical means of removing acetylene from ethylene. Moving in to challenge the widely used catalytic hydrogenation technique is a long-known but little-used low-temperature solvent extraction process employing acetone to remove acetylene at —20 F.

Boston consultant H. C. Schutt, a staunch proponent of the solvent extraction route, cites lower capital requirements as one of its outstanding advantages. Most important cost-cutting features: elimination of catalyst costs, relatively simple process design, minimum of control instrumentation.

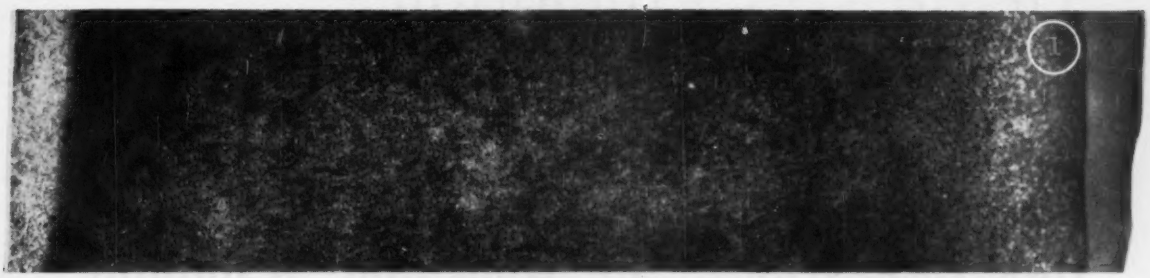
In addition to these savings in capital equipment, Schutt adds, operating costs for acetone extraction are lower —primarily because of reduced fuel charges. Unlike catalytic hydrogenation, which runs at temperatures as high as 400 F, the solvent extraction process takes advantage of the low temperature of the ethylene feed stream to minimize refrigeration costs.

Gaining Users: Low-temperature extraction of acetylene is not a complete stranger to ethylene oxide and polyethylene producers. A number of European processors, such as German Linde, have reportedly turned to acetone extraction. Shell-BASF is also believed to be seriously considering this route for a third major expansion of its German polyethylene plant; Carbide is using it at its Charleston ethylene oxide plant.

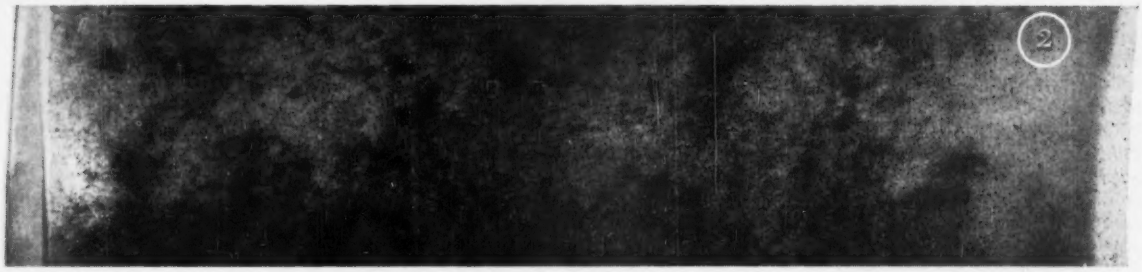
Variations of the technique employing other solvents — e.g., dimethyl formamide—have also been used. But Schutt points to cost advantage of acetone at 10¢/lb. over DMF at 35¢/lb., maintains "you don't need a more expensive solvent". However, the use of DMF permits recovery of commercial-grade acetylene, which may offset the higher recovery cost.

Catalyst Competition: Pointing to recent improvements in hydrogenation methods, catalyst manufacturers don't view acetone extraction as a serious threat to conventional processes. But its operating record in the proposed applications may bolster its bid for more cleanup jobs.

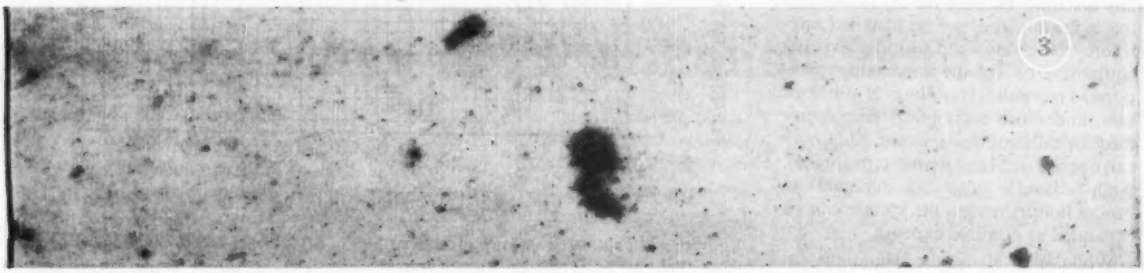
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1 *Vinyl film containing polymeric plasticizer A*

2 *Vinyl film containing polymeric plasticizer B*

3 *Vinyl film containing Eastman Polymeric Plasticizer NP-10*

These three photographs show the results of exposing vinyl films to sun and weather for a period of six months.

The top two samples are plasticized with ordinary commercial polymeric plasticizers, the lower one with Eastman Polymeric Plasticizer NP-10

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The test: *Samples of vinyl film, each containing 50 parts of plasticizer per hundred parts of resin, were prepared using three different polymeric plasticizers. The test samples were exposed for six months on a weathering fence inclined at 45 degrees to the south. At the end of the test period, surface of film was observed for degree of dirt pick-up.*

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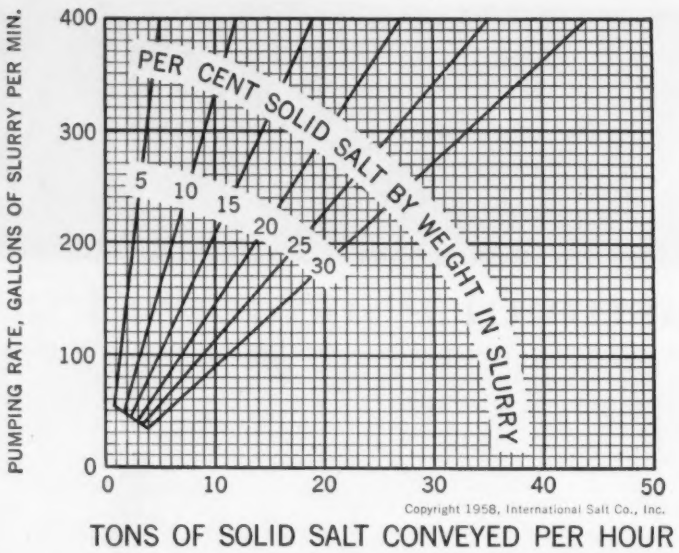
While any Hydraulic Handling installation provides these benefits in some degree, only sound engineering can assure 100% efficiency and economy. Here are a few of the factors that are important to the proper function of every Hydraulic Handling system . . .

Pit design. This differs according to whether salt is delivered by hopper car, boxcar, truck or barge. Where excavation is difficult, special designs are available from International Salt Company for building shallow pits that will operate effectively.

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Some plants also use a high-pressure brine pump to bring circulating brine back to the slurrying pit. Both pump types are available in a choice of materials (white or gray iron, manganese steel, etc.).

Pipelines, valves. Pipelines should have long, straight runs, with as few elbows or other fittings as possible. Valves must offer minimum resistance to the flow of slurry.



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CW PHOTO—JOAN SYDLON

Polymer floor polishes are starting to make big inroads in the industrial maintenance field.

Polymers Shine in Floor-Polish Picture

Polymer-emulsion-type polishes are taking over the floor-polish business in the industrial field — just as they have in the consumer field.* That's the upshot of CSMA's latest survey of the industrial-wax field.

In '58, the shipments of polymer and resin polishes to industrial users skyrocketed to 3,250,987 gal.—a jump of almost 50% over '57's performance (which was 52% higher than '56's showing). At the same time, the old stand-by, high-wax polish (11.5 million gal. were shipped) improved its '57 performance only a few percentage points, although it is still the favorite.

Spectacular as their growth has been in the $40-million/year industrial field, polymer-type waxes have done even more spectacularly in the consumer field. Currently, 85% of consumer-type waxes are of the self-polishing type — and polymer polishes now have 75% of this business.

* Solvent-type waxes (natural wax plus mineral spirits), since they're mostly used on wooden floors where water-based products aren't used, haven't suffered from the introduction of polymer polishes. But what has hurt solvent polishes is the switch from wooden to vinyl flooring by schools, supermarkets, etc. Trewax Co. (Culver City, Calif.) has been racking up good sales on the West Coast with its paste-type Trewax, and A. S. Harrison has recently launched a water-emulsion paste wax which can be used on wooden floors. This type of product is also popular in the industrial field, particularly with contract cleaners.

A look at some of the top sellers in the consumer field discloses how completely polymer emulsions have taken over from the high-shellac-type products and the older, wax-rich types.

S. C. Johnson (Racine, Wis.), top seller in the retail field, has a polystyrene polish, Glo-Coat, and an acrylic, Klear. Simoniz Co. (Chicago) introduced its polystyrene Vinyl Floor Wax in Dec. '57. Boyle-Midway Inc., (Cranford, N.J.) is said to have changed its Aerowax to a polymer type, and Beacon Co. (Cambridge, Mass.), which led the trend to high-shellac polishes, is now on the polymer path. Continental Wax Co.'s Six-Months Floor Wax is now a high-wax and polymer type—and it may be switched to a high-polymer type, according to trade talk. Big private-brand sellers, such as Sears, Roebuck and Stanley Home Products are said to have polymer polishes.

Here's the Favorite: Generally these products have a formula similar to the following: 60% polymer (mostly polystyrene or acrylic), 20% wax (synthetic, natural or blends of the two) and 20% alkali-soluble resins (natural resins such as shellac, or Loba C or synthetics such as phenolics or maleic-modified phenolics). Most have a solids content of around 12-15%. (Johnson's Klear has 18% solids.)

The high-shellac-type product, (80% shellac, 20% resin) popular in the late '40s and early '50s now constitutes only about 15% of the retail emulsion-wax market. Some products of this type still sold are Fuller Brush Co.'s (Hartford, Conn.) Full-brite and Solarine Co.'s (Baltimore) Solarine Wax. Reily Chemical (New Orleans) and Protex Wax Co. (Oakland, Calif.) and the A&P Co. also have high-shellac products.

High-wax-type products (80% wax, 20% wax-soluble resin in water), which were popular in the '30s and '40s, now probably hold only about 10% of the emulsion-type retail market. A. S. Harrison's (South Norwalk, Conn.) Kitchenwax is a high-wax type, as is Johnson's Stride. Chemical Corp. of America's (Tallahassee, Fla.) insecticidal Freewax (containing lindane) is a high-wax-type product. And many private-brand products are also high-wax-type products.

Yet to choose a course is Purex Co. (South Gate, Calif.), which just acquired Franklin Research Co. (Philadelphia). Franklin has made both natural and polymeric-type products

TRENDS* IN FLOOR POLISHES

Before 1927	Floor polishes mostly high carnauba wax-content paste products.
1927	Introduction of water-emulsion waxes.
1929	Introduction of first self-polishing water-based wax, Dri-Brite.
1934	Shellac begins to become popular as gloss and toughener aid in carnauba wax emulsions.
1936	Alkali-soluble resins, such as terpene polymers, begin to find use with, or in place of, higher-priced shellac.
1945	High postwar price of carnauba wax (up to $2/lb., prompts move toward substitutes such as microcrystalline, polyethylene, and Fischer-Tropsch waxes.
1947	Beacon introduction of high-shellac (70%), low wax (30%) product starts new movement. Johnson switches to high-shellac in '51 with Hard Gloss Glo-Coat.
1953	Introduction of small-particle-size polystyrene polymer by UBS Chemical signals trend toward nonwax polymer. Simoniz first major company to make the switch.
1957	Johnson launches Klear, an acrylic polymer polish. Johnson also starts making its own polymers, spurring movement in that direction by polish makers.
1959	T. F. Washburn introduces Simplex 40, its "add water and stir" polystyrene emulsion for formulators.

* Approximate dates

under its own name, could turn out either for Purex.

Not So Fast: In the industrial field, polymer-emulsion waxes now have about 25-30% of the emulsion-type polish market. Reasons the growth in this area has been slower than in the retail field: while the housewife is looking for high initial gloss with high clarity and slip resistance, the maintenance people want toughness, rebuffable qualities and durability — such qualities as carnauba wax products have. Polymer-type products have the qualities that the housewife now wants and when just two companies, S. C. Johnson and Simoniz, switched their household products to that type, over 60% of the market was therefore switched.

In the industrial field, however, there are some 200 companies that turn out floor polishes and a changeover by two companies doesn't set a trend as it does in the retail field.

The Polymer Picture: A rough outline of how the polymer polishes got where they are:

UBS Chemical (Cambridge, Mass.) is most often given the credit for the big push for polymers. The company was first (five years ago) with a styrene polymer (Ubitol U-2001) with small-enough particle size (0.03 microns) suitable for high-gloss polishes, although it was not the first firm to offer a polymer for floor polishes.

Before UBS ever got into the floor-polish polymer business, many companies had been working with various polymers intent on capturing the business. Foster D. Snell, in fact, has a patent (U.S. 2,596,960) covering emulsion-polymer floor polishes which was applied for in '47 (granted in '52).

Big sales points for the polystyrene emulsions products are high gloss, good leveling and easy removability. The price is the lowest of the polymeric materials now used in floor polishes. Suitable polymer systems currently sell for around 17.5¢/lb. These products, unlike acrylics or styrene-acrylic copolymers, require the addition of a plasticizer (usually dibutyl phthalate and/or tributoxyethyl phosphate are the ingredients.)

A recent development in the styrene products is the offering by T. F. Washburn (Chicago), of a 40%-solids concentrate. To this material, a waxmaker simply adds cold water and stirs, to get a high-gloss water-emulsion polish. Washburn told *CW* that this emulsion concentrate, called Simplex 40 (it sells for $2.54/gal.), allows a would-be wax marketer to turn out a gallon of wax for about 80¢ or $1. But even cheaper polishes, costing around 70¢/gal., could be made.

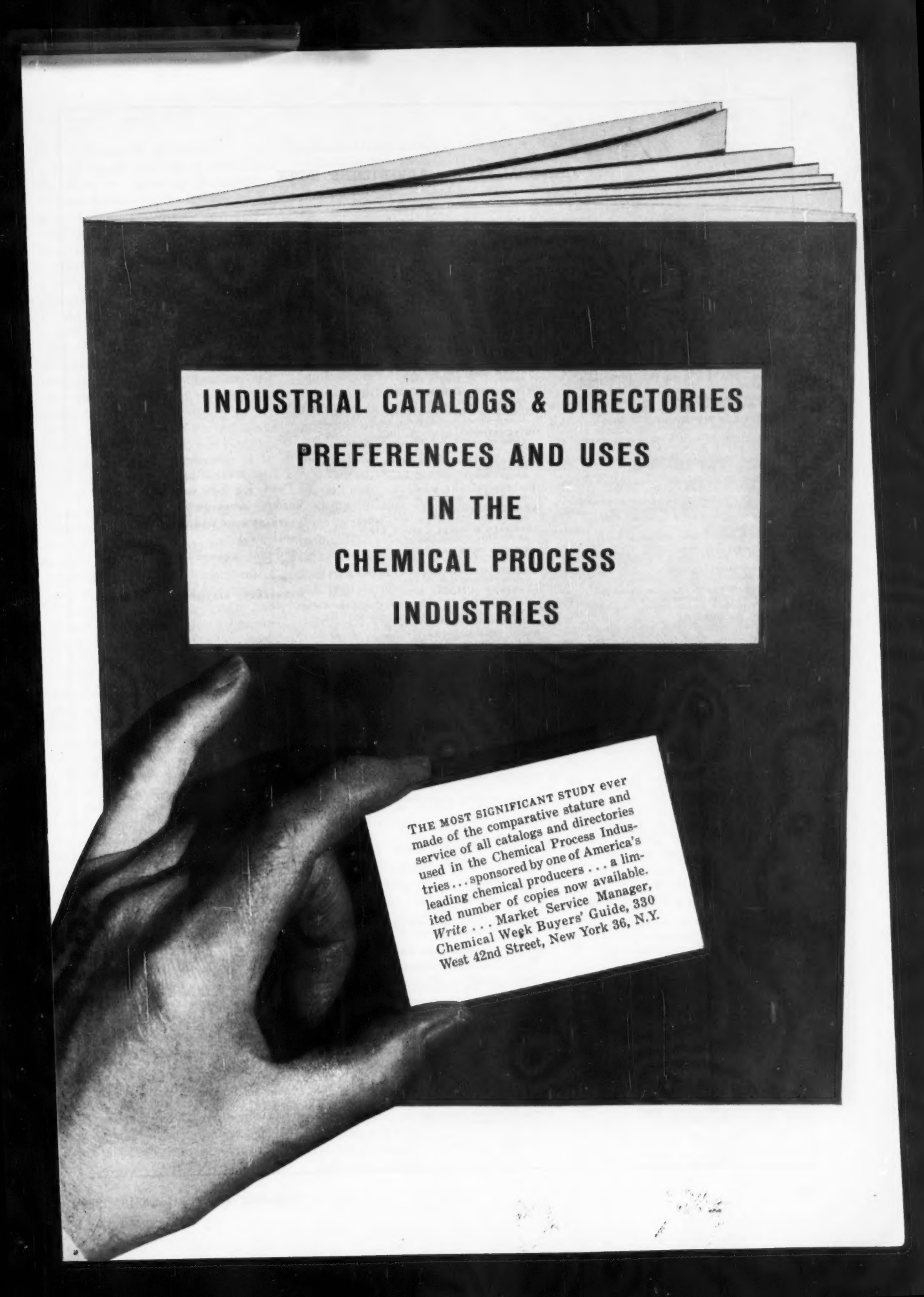
This concept of an add-water-and-stir wax isn't new, however. Concord Chemical (Camden, N. J.) has had on the market for about four years a product designed for such easy formulation. Concord's material, called Co-Wax (48¢/lb.), isn't a polymeric material — it's a high-wax-containing product that requires an additional synthetic resin — also available from Concord.

Clear Case for Acrylics: The trend to increasingly colorless, clearer floor coverings has led waxmakers to turn to acrylics. Though Rohm & Haas has long suggested use of its materials in floor polishes, the credit for developing a polymer for this use is generally given to R&H and to Polyvinyl Chemical (Peabody, Mass.), which brought out NeoCryl A234U around '55. Though not as high in gloss as styrene polishes, the acrylic-based products have better stability, do not require the use of a post-plasticizer—though some makers, such as Reichhold, use one. Cost of suitable acrylic polymers is higher than that of styrene polymers — 17-22¢/lb. for a 40%-solids product.

Combine the Two: Borden Chemical is currently pushing a styrene-acrylic copolymer (at 17½¢/lb.) called X-172. Its big advantage, according to Borden, is increased resistance to heel-marking. The company is also playing up the elimination of post-plasticizing as an advantage.

But Borden is not the first to come up with a styrene-acrylic copolymer. One company which previously marketed such a product dropped it in favor of physical mixtures of styrene and acrylic polymers.

Obviously many other polymers have been looked at as components of floor polishes (the Snell patent covers a long list of them) but none appears likely at this time to pre-empt


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styrene or acrylic polymers.

Vinyl acetate has been a contender but there are problems of stability and removability, even though gloss is good. Butadiene-styrene and polyvinyl chloride latexes don't give good gloss, according to wax makers.

There have been some polymer makers who have tried spray-drying polymers, which are added to water at the formulator's plant to save freight charges, but *CW* could find only mild interest in them on the part of waxmakers. The entrance of increasing numbers of polymer makers has created a competitive situation where freight is now equalized or allowed, and freight costs are not a big factor. Stability of all the popular emulsions is good — there is little need for a dry product.

Who Makes Polymers: The list of polymer makers grows long. UBS Chemical, Borden Chemical and Acme Shellac (Newark, N.J.) all supply acrylic, styrene, and styrene-acrylic copolymers. Polyvinyl Chemical offers acrylics and styrenes. Bareco Division of Petrolite (Tulsa, Okla.), Mac Lac Shellac (New York) and Monsanto (St. Louis) supply styrene polymers. K. J. Quinn (Malden, Mass.), Reichhold Chemicals (White Plains, N.Y.) and Rohm & Haas are supplying straight acrylics. National Starch has been on-again-off-again with an acrylic-vinyl acetate copolymer (Resyn 2400) for polishes.

Make It Themselves: There's been a trend for waxmakers to make their own polymers. S. C. Johnson has had a styrene polymer plant in operation for several years, is now making its own acrylic polymer as well. T. F. Washburn also makes its own polymers, as does Treo Wax (Brooklyn, N.Y.). Beacon Co. also reportedly will be manufacturing its own polymer soon. The Simoniz Co., which could justify a polymer operation more economically than many companies, is said to be getting most of its polystyrene polymer requirements from nearby Morton Chemical.

A polymer formulation plant can be put together for around $100,000, but a really flexible operation will cost closer to around $250,000, according to trade sources. Polish makers can save substantial sums making their own polymers, but the rising number of suppliers of these products makes captive polymer plants less economically attractive each year.

Alkali-Soluble Resins: There has been little activity in alkali-soluble resins. Reichhold Chemicals' fairly new Waterez resin 1551 (modified alkyds from esterification of phthalic anhydride with polyols) has a lighter color (but reportedly has less stability) than some older products. It is said to be selling well. Monsanto, within the last year, has brought out Lytron 822 (a styrene-maleic anhydride copolymer with probably another monomer). The Monsanto product also has a lighter color than the older phenolic materials. Prices of the Monsanto and Reichhold products are both around 50¢/lb.

Borden, has a biologically stable casein that it may offer as a shellac replacement, but it is not yet selling it for that use.

Shellac Strong: Despite all the efforts to replace it, shellac is still the major alkali-soluble resin used by waxmakers — especially in the household field. It's still considered the best leveling agent available, and because its price appears to have stabilized, the search for replacements has abated.

Wax Wrapup: Few new developments were noted by *CW* in checking into wax formulations used in polymer polishes. Since the new polymers are compatible with both the older natural waxes (like carnauba, candelilla, and ouricury) and newer synthetics (like oxidized microcrystallines, polyethylene and the Fischer Tropsch waxes such as Dura Commodities' Duronox J-324), there's been little incentive for new developments in this area.

Look for more germicidal waxes (using bithionol derivatives) like Penetone's (Tenafly, N.J.) Demon and West Chemical Product's (Long Island City) Super Westwax. Lehn & Fink is reported to have one coming up—but the company denies it.

Waxes containing insecticides (mostly lindane) in them may become more popular. In the near future Chemex Inc. (Orlando, Fla.) is scheduled to come out with such a product.

The boom in home building, growing popularity of recreation rooms, schools necessary to house the U.S.'s growing population, the building of larger and larger supermarkets and the increased footage in office space all point to continued growth for the floor-wax makers.

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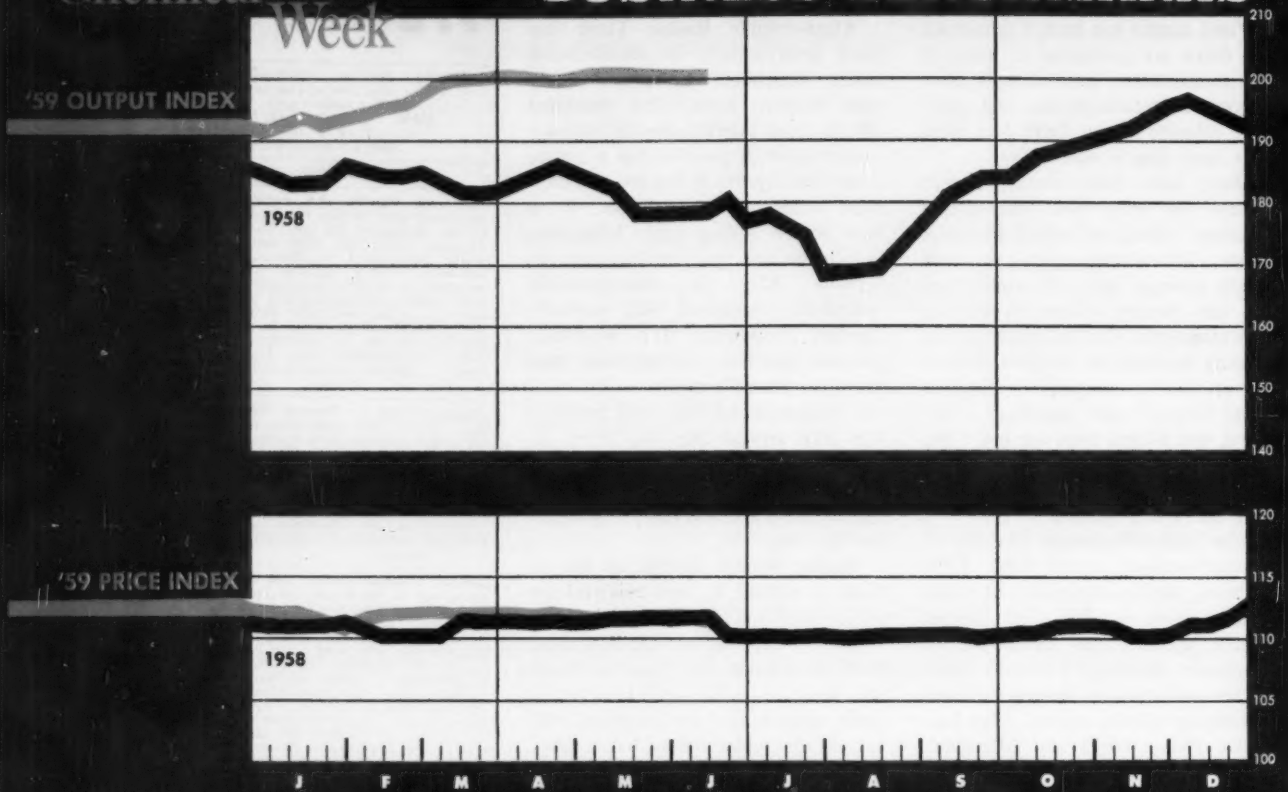
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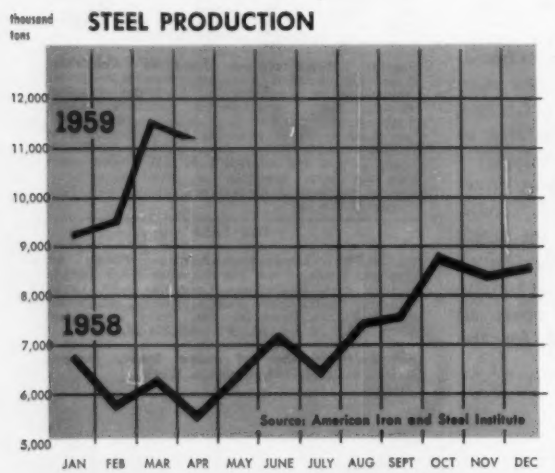
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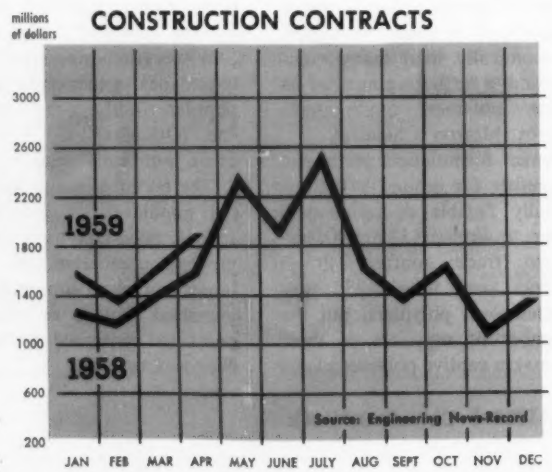


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Chemical Week output index (1947-1949=100)	201.3	201.0	178.0
Chemical Week wholesale price index (1947=100)	111.9	112.3	110.8
Stock price index (11 firms, Standard & Poor's)	58.46	58.91	39.61
Steel ingot output (thousand tons)	2,674	2,650	1,685
Electric power (million kilowatt-hours)	12,761	12,931	11,155
Crude oil and condensate (daily av., thousand bbls.)	7,203	7,216	6,242

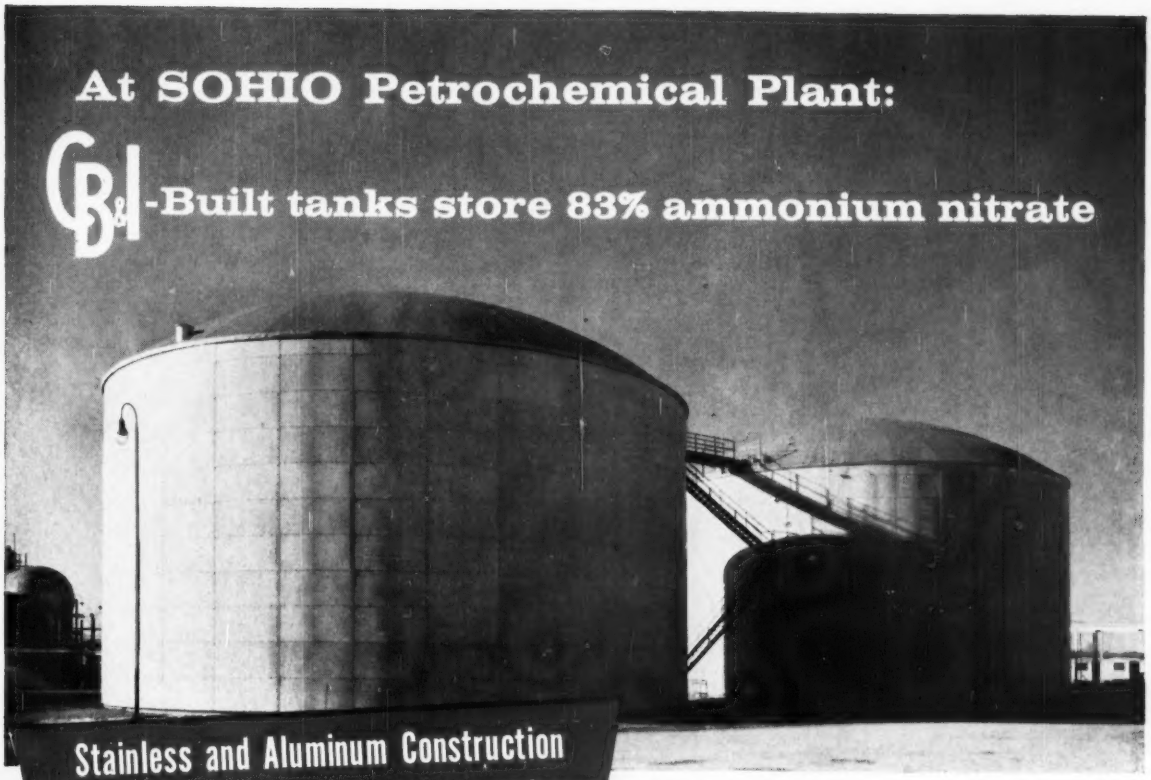
MONTHLY INDICATORS—Production 1947-49=100	Latest Month	Preceding Month	Year Ago
All manufacturing	150	149	127
Nondurable goods manufacturing	140	141	125
Durable goods manufacturing	166	164	133
Chemicals and allied products	206	204	180
Petroleum and coal products	142	146	124





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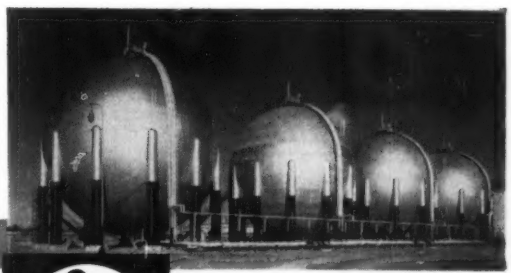


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SD Plants gives you a quality-built plant

PLUS



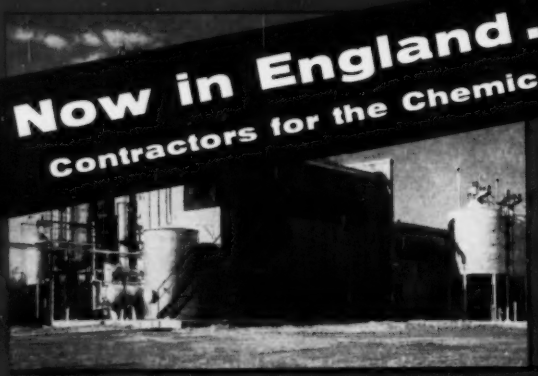
The plus you get is a *new approach to construction,* which permits SD Plants Incorporated to take full responsibility—from soil analysis through operation of equipment—for your new chemical construction projects. In addition, SD Plants offers:

- Combined know-how of seasoned construction personnel and chemical engineering experts
- Reputation for plant operability
- Continuous checks and balances between design and construction
- Lower costs
- Earlier profits for earliest construction time
- Guaranteed construction completion date

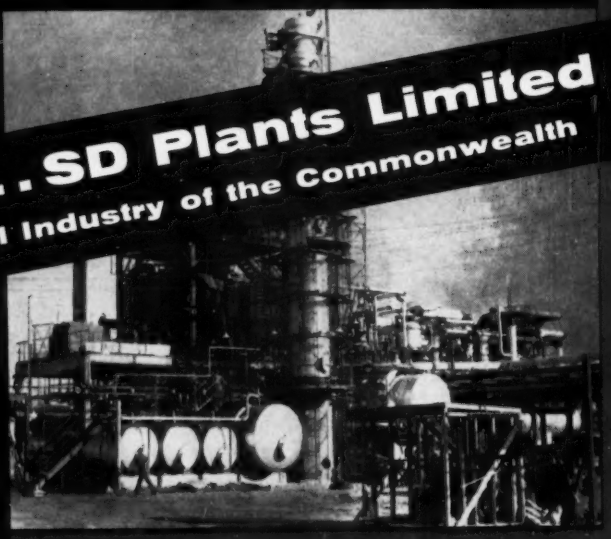
Large 60,000,000 lb. per year ethylene oxide plant for General Aniline and Film Corporation completed in 1958 by SD Plants Incorporated.

Now in England . . . SD Plants Limited

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This polyvinyl chloride plant, built for Cary Chemicals, Inc., is typical of the three PVC plants completed in 1957.



This phthalic anhydride plant for Witco Chemical Company was constructed by SD Plants Incorporated, and is now on stream.

SD PLANTS INCORPORATED

TWO PARK AVENUE, NEW YORK 16, NEW YORK

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Catalyst Development Corporation, 59 Industrial Avenue, Little Ferry, New Jersey
Société Française des Services Techniques S.a.r.l., 52 Champs Elysees, Paris 8e, France

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